

MINICAM

THE MINIATURE CAMERA
MONTHLY

NOVEMBER

25c

CHILDREN IN ACTION

SHOOTING THE STARS

SPEED FLASH
PHOTOGRAPHY

THE MYSTERIOUS F

MOVIES, 1938 STYLE

TRICK SHOTS WITH
YOUR CAMERA

CLOUD PHOTOGRAPHY

SNAPPING AUTUMN
WOODS

GUNNING WITH YOUR
MINICAM

WHAT FILTER?

VARIATIONS IN FORM

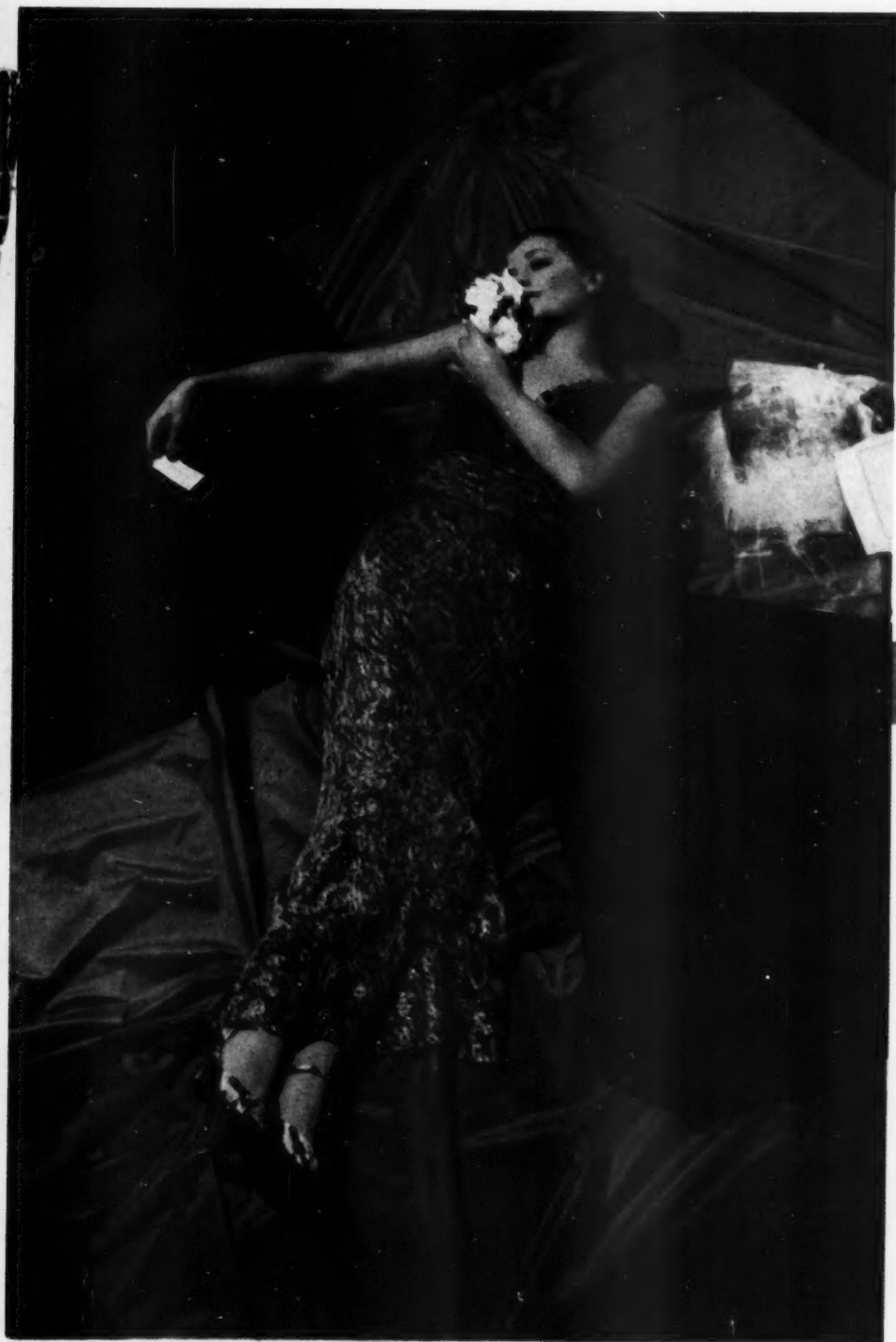
HOW TO MAKE
A SALON SUBMISSION

MAKING MICRO-COPIES

DEVELOPING THE
MINIATURE NEGATIVE

A Book Length Feature





What do you think?

WHAT should a camera magazine contain?

We've written thousands of letters to camera fans throughout the world asking just that question. The replies, after being carefully read and tabulated, are the measuring rod we use to edit MINICAM.

If you didn't receive one of our letters, we'll consider it a personal favor if you'll write us saying what you want most of all in your camera magazine.

Thus far, readers have asked for the one thing MINICAM aims chiefly to give its readers. *Ideas!* Each issue must be jammed packed and bristling with ideas providing more amusement, more fun, and more entertainment for your camera.

A camera is more, infinitely more, than something to record the change in your acquaintances during the years. Your camera is a mighty lever offering entrance into education and sport. Think of clouds for instance. Have you ever made a study of them? This issue of MINICAM directs your attention to cloud photography, and offers you ideas in taking cloud pictures.

Do you like trick shots for relaxation? Then see the lead article of MINICAM for ideas and instruction on making two and two equal zero. The heavens above, long the staring ground of philosopher and fool alike, are fertile fields for your camera. This issue tells you how to shoot the stars, and get a great big thrill out of it. This is the season for tramping the woods for health and for the pleasure of nature's own beauty. MINICAM tells you how your miniature camera can add worlds to your pleasure of autumn sunshine. But let's not stay here talking on the front porch. Come on in . . .



STUDY IN COLOR

BY VICTOR KEPPLER

Mr. Keppler is the Floyd Gibbons of photography. Best known for his covers on *New York Woman*, he was one of the first to work in natural color. In this brilliant "one shot camera" study his sense of color juxtaposition is at its height.

NEW!



ROLLEICORD Cameras

Precise ground glass focusing—in actual film size and in sharp detail—built-in finder lens—all the features associated with Rollei Cameras—all the refinements that facilitate Rollei photography and that distinguish Rollei performance.

MODEL II a—with Zeiss Triotar f/3.5 in Compur Shutter with speeds up to 1/300 second. Features:

- **RAPID FILM WINDING**—with automatic stop after film is turned to next frame.
- **ONE-LEVER** Setting and Releasing Shutter (Patented).
- **HIGH-SPEED FINDER LENS**—provides luminous, easily focused image.
- **FOCUSING HOOD**—Opens and closes with slight, one-finger pressure.
- **THREE-LEVER FRONT BOARD**—for instantaneous adjustments of diaphragm, shutter speeds and for setting and releasing shutter. All essential working parts concealed. \$82.50

MODEL I a—with Zeiss Triotar f/4.5 lens. A particularly low-priced camera possessing all the essential features of the Rollei series. Includes focusing hood with wire-type sport finder for eye-level observation. \$55.00

Rolleicord Cameras make 12 exposures $2\frac{1}{4} \times 2\frac{1}{4}$ inches (6x6cm) on standard 120 roll-film.

These new models do not replace the older, regular cameras of the Rollei series which are naturally available at their listed prices. Literature on request.

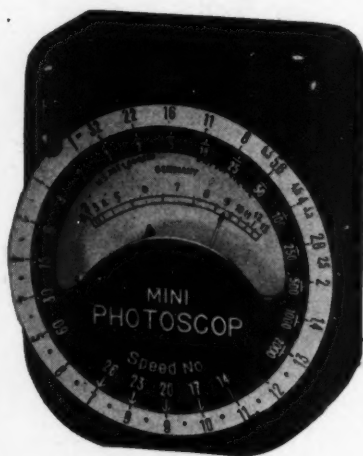
FREE TRIAL GLADLY GRANTED

BURLEIGH BROOKS

INCORPORATED

127 West 42 Street New York

AT LAST!
WHAT EVERY SERIOUS
PHOTOGRAPHER HAS WANTED



(ACTUAL SIZE)

The
MINI-PHOTOSCOP
A New, Original Photo Electric Cell
EXPOSURE METER

for Movie and Still Cameras that
 Performs Under All Conditions.

At An
 Unheard-of
 Low Price

\$14.75

Complete
 with Case

The size is approximately that of a
 package of cigarettes; no sharp cor-
 ners, everything rounded, smooth,
 streamlined.

MAIL ORDERS FILLED

Illustrated booklet sent on request.

Write Dept. M. M.

Willoughbys

World's Largest Exclusive Camera
 Supply House

110 West 32nd Street, New York

"At the Sign of the Camera"



THE RIGHT DEVELOPER
FOR THE RIGHT JOB!

Edwal developers are not make-shift
 "claim-everything" products. They are
 designed by scientists to do specific
 jobs and they do their work well.

EDWAL-12—For candid camera work

Speed! We recommend 1/2 normal exposure. Printable
 negatives have been made with 1/16 normal. Truth-
 ful gradations. Any degree of contrast you want.
 Enlargements to 25 diameters.

EDWAL-20—For outdoor photography

For landscapes, sea-shots, vacation pictures — wher-
 ever you value easily controlled contrast, exquisite
 gradations, wealth of detail. Enlargements to 30
 diameters consistently. 60 diameters if you are careful.

MINICOL—For texture

Use it for portraits, still life, close-ups, technical
 shots, wherever surface texture is important. Assures
 "juicy" prints 100% of the time.

Available in powder or liquid form. Ask your
 dealer or write for the Edwal booklet.

THE *Edwal*

LABORATORIES

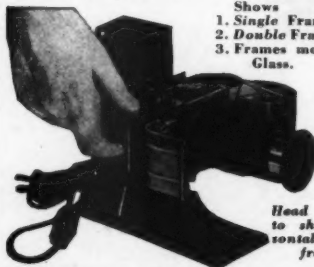
112 FEDERAL ST. CHICAGO, ILL.



"THREE Projectors
in ONE"...
For 35 mm "STILLS"

Shows

1. Single Frame Strips
2. Double Frame Strips
3. Frames mounted in Glass.



Head swiveled
 to show hori-
 zontal double
 frames.



Tri-Purpose
PROJECTOR

The S.V.E. Tri-Purpose Projector, Model CC
 projects each 35mm "still" life size and brings
 out details with amazing brilliancy and realism.
 Color transparencies, mounted in glass, are
 especially beautiful, projected by this light-
 weight inexpensive equipment. A perfect Christ-
 mas gift for your candid camera friends. Sold
 by leading dealers everywhere. Ask about the
 S.V.E. Tri-Purpose Projector today and write
 for folder now!

SOCIETY FOR VISUAL EDUCATION, Inc.
 Dept. M., 327 So. La Salle Str., Chicago, Ill.



C O N T E N T S

VOL. 1

NOVEMBER, 1937

No. 3

COVER

Lady In Distress.....by Dudley Lee

COLOR PLATES

Study In Color.....by Victor Keppler

The Sisters.....by Charles Jones

ARTICLES

- | | |
|---|---|
| How Did They Get It?..... 7
By Thomas Morgan | Cloud Photography..... 47
By Jacob Ritter |
| Shooting The Stars..... 13
By Herbert C. McKay, F.R.P.S. | Gunning With Your Minicam..... 53
By Harry Harris |
| Speed Flash Photography..... 19
By John Coner Robertson | What Filter?..... 61
By E. M. Ludlam |
| Autumn Woods Photography..... 27
By Samuel Brown | Movies 1938 Style..... 68
By William Mundine |
| Variations In Form..... 33
By George A. Bohnell | Developing The Miniature Negative..... 74 |
| Shooting Children In Action..... 41
By Carroll Taylor | A Merry Candid Christmas..... 89
By Karl A. Barleben, F.R.P.S. |

Editorial and Advertising offices, 22 East 12th St., Cincinnati, Ohio.

Managing Editor, Kenneth Houston. Technical Editor, Herbert C. McKay, F.R.P.S., Associate Editors, Karl A. Barleben, Jr., F.R.P.S., Jacob Deschin, H. Crowell Pepper. MINICAM—The Miniature Monthly is published monthly by Automobile Digest Publishing Corp. Yearly subscription, \$2.50, in U. S. A. and possession, Canada and countries in Pan-American Postal Union, \$3.00. Elsewhere, \$3.50. Single copies, 25c. Title registration applied for. All material submitted for publication must be accompanied by a stamped, return envelope and a statement of release from models used.

MINICAM—THE MINIATURE CAMERA MONTHLY

HOW DID THEY GET IT?

By Thomas Morgan

THE hand is quicker than the eye." Thus the magician opens his act of disappearing cards, rabbits from a hat and, of course, the woman sawed in half. There is another saying that goes like this: "You can't fool a camera." To which we reply, inelegantly, "Sez you." For the hand can delude not only the human eye, but also the camera's unwinking stare and fool it worse than any magician would dare try to hoodwink even the most gullible audience.

The limits of what you can make your

minicam do are bounded only by your own ingenuity and imagination. You can put it through paces that will make the average uninitiated person exclaim with the hillbilly who saw his first giraffe, "There ain't no sech animal." Do you want to show a person apparently talking to himself? That's one of the easiest stunts. Spirit and ghost pictures? Shots of scenes that never existed, made of three and four different negatives? Portray a subject against a background he never saw? Show a girl sailing through the air? Human statues? Pictures that stand out from the paper? The list could be continued indefinitely, so, instead, let's look at a few of the more startling effects you can do at home, with your own camera and without elaborate props.

Have A Good Talk With Yourself

Kindly souls are always advising us to sit down and have a good talk with ourselves. Here's a chance to give one of them an opportunity to take his own advice. There are two ways of going about this, depending on whether your victim is in on the deal or whether it is intended as a stunt to surprise him.

The first method is through double or multiple exposure, that

Fig. 1. How New York looks to an automobile headlamp. Any curved, polished surface can be used to take mirror distortion shots such as this. This shot was made with a concave mirror. If a convex one had been used the objects would seem to be flying apart instead of falling together. Mirror distortion shots can be adapted to a wide variety of trick effects as detailed in the accompanying text. (Acme)



Trick Effects

with your Miniature Camera

is, exposing your film with part of the lens covered over and then exposing it again, this time covering up the part previously exposed. For this purpose you need a dark card to hold in front of your lens. A better way, if the construction of your camera will permit, is to cut a disc the size of your lens and then divide it into two, slipping the cut card tightly against the lens mount. After you have made your exposure, pose the subject again, a little distance away, be sure the exposure time is identical, move the card to the other half of the lens and the trick is done.

Many amazing effects can be evolved from this simple procedure of double exposure. "Spirit pictures," for example, are an easy variation of the above procedure. First choose your "spirit," in all probability an amiable young woman dressed in appropriate garb or even decked out in a sheet, if your fancy happens to run that way. Now pose your ghost against some background that has definite objects in it which can be seen "through" your ghost. If you intend to use another person get him or her set also.

When everything is ready, give the scene a rather short exposure, about one-fourth of normal. Close the shutter, remove the "ghost" without disturbing your other sitter or any object and proceed to give the scene the balance of the normal exposure. When the picture is developed and printed, the under-exposure of the ghost will give that wispy, seen-through appearance at the thought of which we get cold shivers in the night. As you see, the spirit effect is nothing more than under-exposure of part of the ordinary double exposure stunt. After all, a magician doesn't tell how he does his stunt; so you needn't either.

Spirit pictures have to be prearranged, but double exposure need not be. Some minicams are so constructed that there is an automatic guard against double exposure, which means you can't spoil your film even if you want to. Of course, you can take your shot, rewind and shoot again, but this is hazardous and frequently won't work. Under those circumstances, we are forced to go to the enlarger for our double effect.

Fig. 2. A striking example of the "worm's-eye" view. Note how the foreshortening of perspective makes the feet and legs of this catcher look enormous. You can easily make people look nine feet high and get other trick effects from this simple stunt.





The Swing

By William M. Rittase.

Fig. 4. A dynamic example of the faked shot. The subject was posed in a studio as explained in the text. Lighting was one 1500 watt light overhead, one 1000 watt to the right of the subject and a spotlight on her hair. Swing the picture in such a way that the end of the rope is at lower right and you will see how it was posed. Exposure $1/15$ th at $f/8$. The clouds were printed in from another negative in the manner explained in this article. Credit Black Star.

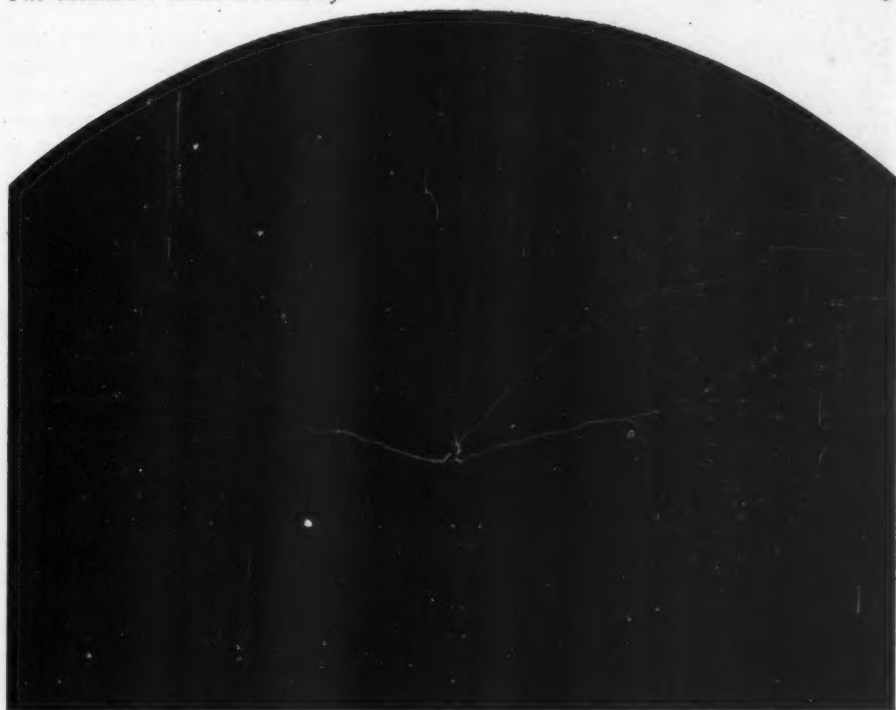


Fig. 3. Have you ever wondered what 40,000 volts looked like? Here is a shot of electricity crackling from one pole of a circuit. The pole was immersed in oil. The delicate flower pattern traces the path of the "juice" through the oil. Such patterns vary constantly.

DDOUBLE exposure in enlarging is really a variation of dodging, that is, hand control. The original negative should be one that was taken either against a neutral black or white background or against one of those soupy backgrounds of foliage that blend together readily. Put the negative into its carrier and with an orange cap over the enlarger lens, frame the picture on one-half of the enlarging paper. Take a stiff card, about the size of the picture you are printing, or a bit larger, and hold it approximately a foot from the printing paper in such a way that it covers the portion not being exposed.

Now remove the orange cap and give half your paper the proper exposure, making sure to move the card in your hand to and fro so that the outline at the edge will be softened. Be sure that no light from the enlarger spreads over the part of the paper you are shielding. This finished, reverse the negative in the carrier and duplicate your work on the other half of

the printing paper, this time shielding the part previously exposed.

A bit of practice and the willingness to spoil a few test sheets are all you need. So long as your backgrounds are plain or vague and you remember to keep the card moving, nobody will be able to tell where the two halves of the picture meet. Here again, you can work in variations with triple or more exposures, or by printing one figure large and the second tiny as a doll. This last is accomplished merely by moving your enlarger nearer to the paper and refocusing. If your enlarger is not equipped with an orange cap, a strongly tinted piece of gelatin will serve just as well. But be sure not to turn on the enlarging light unless your paper is protected against the direct beams, otherwise you will simply fog it.

Where Were You Last Thursday?

Do you want to "prove" that your friend was someplace he will indignantly deny ever having seen? There are several



Karl A. Barleben, Jr. By Morris Germain, F. R. P. S.

Fig. 5. This startling shot is a bas-relief portrait made by putting together a negative and a positive of the same picture and printing them simultaneously, slightly out of register. The original print by this method must be touched before you would believe it was not actually raised from the surface of the paper. See text for complete instructions.

ways of getting this effect. Here is one of the simplest. Pose your subject against a white background and light the background in such a way that no shadow falls on it. This can be accomplished by placing one or more Photofloods in reflectors on the floor behind the sitter in such a way that all their light is directed upward on the background. In addition, the subject should be two or three feet from the background. Be sure to check on all shadows since this is important. Give a quite full exposure so that the background will come up strongly.

The result will be a negative in which the background is a solid black, that is, one which will not pass any light and will leave the printing paper unaffected. Select the background you want to use and print

it first, taking care to print it just a trifle out of focus so that it will look as though it were "behind" the subject. Now print in the subject, giving it full exposure under the enlarger to make sure that it covers up the part of the background over which it is printing. It will help if you outline lightly on the printing paper the approximate position to be occupied by the figure and to shade this part with your hand or a card at the time the background is printing. The card should be considerably *smaller* than the figure and held about one foot from the paper. Remember to keep it moving.

Combination Pictorial Printing

Combination printing, of which the faked background is one manifestation, can be elevated to produce pictures of great beauty and dignity, even though they be of scenes which never existed except in your own imagination. The easiest and most frequently used device is that of printing in clouds. You probably have taken dozens of pictures that would be improved with a few clouds in the sky which, unfortunately weren't handy at the time.

If your sky is quite clear or if it has only a very slight tone you can easily print in clouds from another negative or from a cloud negative. The only precaution you need take is that the light on the clouds is the same as the light on the scene into which they are to be inserted. General procedure is to print your pictures first, shading the sky area with a card. Next print in the clouds from the second negative, this time shading the pictorial part already exposed. It will take you only an hour or two in the darkroom to acquire the knack of doing this. Be sure to make preliminary test strips of both halves of your picture so that the tonal quality will be the same. If your sky already has a slight tone, allow for this by shortening the cloud exposure a trifle.

From printing in clouds it is only a short step to adding a few birds in the sky. Or if there is an unsightly telephone pole over in one corner, you might "dodge" it out with your shading card and print in

a sloping hill from still another negative. Do you want to add a boat to a vacant lake? Or a figure to a lonely landscape? The technique is identical. Some of the greatest masterpieces of salon exhibits have been made in just this way, out of two, three or even four negatives, none of them particularly promising of themselves, yet combining into a hauntingly beautiful pic-

ture through the magic of combination printing.

She Floats Through The Air

The girl is poised on the edge of the springboard, muscles tensed, caught in that incredible split-second before the dive will shatter the composition. Or she is swinging through the air, fingers outstretched for the trapeze just out of reach. You have seen a hundred variations of both these pictures. Posed that way? Not on your tintype. You might catch a pose like that, impromptu, if you happened to be born lucky, but the chances are all against you. No, it's much easier to fake it and, ninety-nine times out of a hundred, that's how the ones you admired so much were done.

The principle involved is "framing" in printing. There's no law that says you have to print a picture the way the camera took it. You can print it sideways, or upside down, or tilted, or any other way that happens to suit your fancy and your needs. Let's look at "The Swing."

The subject was posed against a neutral black background. This was done to pro-



Smoke By Andre Steiner
Fig. 6. This startling shot is one of the effects to be achieved in close-up photography. Taken with a Leica 35 mm. lens, exposure 1/30th at f3.5. Similar effects can be achieved with any minicam short focus lens.

Divertisement

By Morris Germain, F. R. P. S.
Fig. 7. This amusing shot is an example of the sort of picture you can get by keeping your eyes open and your imagination alert. Mr. Germain noticed the strong shadow on the sand, grabbed his props from a nearby beach party and the picture was done. Shadows can be tellingly used to create effects both humorous or grotesque. Exposure 1/60th at f9.



vide a perfectly dense background so that later, when the picture of the girl was tilted, you wouldn't be able to detect it from the slant of background objects. Neutral background, whether it be white, gray or black, is absolutely essential. Later, you can print it in just as clouds were printed into this shot. In most cases, however, the plain background will do just as well.

If you will tilt the picture, from left to right, so that the end of the "cord" is at lower right, you will see how the shot was posed. The model merely lay on the ground, holding the swing against her, the cords pulled tight to give the impression that her weight was suspended from the swing. The extension of the cords, beyond the model's hands, were later retouched in. For complete details of the lighting used, see Fig. 4.

When the film was developed and a test print made, Mr. Rittase had a picture of a pretty girl lying on the floor in a pretty comical position. However, by turning the paper easel on his enlarger, he got just the effect he was after. Now, from another negative he selected the proper cloud effect and printed this first, then printed in the figure of the girl on the swing. Finally, the extension of the cords was retouched in with pencil and white paint, and the job was finished as you see it.

Here, too, variations are literally endless. As with most types of trick effects, once you know the basic procedure, you can ring in countless changes of your own. Very often, negatives that you took with no thought of tricks in mind, will lend themselves to unexpected treatment through "framing" in enlarging. It's a good idea to acquire the habit of looking at every shot from all angles on the enlarging easel before you print it. Sometimes a turn of half a quarter will make all the difference between a powerful, dynamic composition and just another routine picture.

Hold A Mirror Up To Life

MIRRORS! Their trick possibilities are legion. Two mirrors properly placed will give that back and forth type of multiple reflection that will make one person look like an army. Or you can

take a picture of yourself taking a picture of yourself on and on until you get dizzy thinking about it.

Mirrors lend themselves admirably to caricature, long skinny shots and short dumpy ones, depending on the mirror, as in Fig. 1. Lacking a distorting mirror, any polished curved surface will do just as well. By turning the angle of the surface, you can get any effect or degree of distortion you please. With all types of mirror shots, you must be careful that you don't accidentally include yourself in the picture. Generally a slight shift in camera position will take care of this, should that problem arise.

Here is something to remember about mirror pictures. When focusing on the image in a mirror, the camera must be set for the distance from camera to mirror *plus* the distance from mirror to subject. Thus, if you are five feet from the mirror and your subject two feet from the mirror, your camera must be focused for seven feet. When both the person *and* his reflection are shown, focus merely from camera to reflection *and stop down the lens as much as possible*.

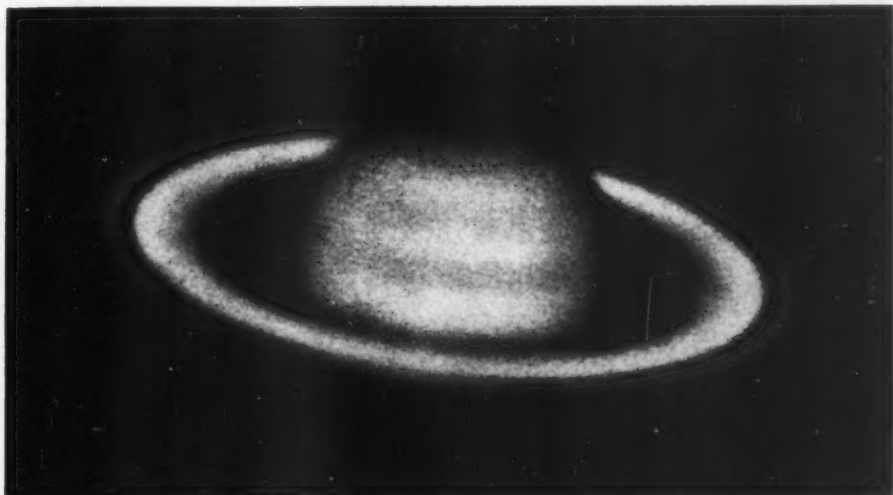
From mirror distortion, the next logical step is planned distortion of a normal shot. The technique here parallels what a cartoonist normally does, that is, he takes some characteristic of a subject and exaggerates it to the point of comedy. Thus, a thin person appears enormous, a stout one almost round, etc.

Distortion is introduced into a picture during enlarging. The negative is inserted into its carrier in the normal way. Next, the paper easel is tilted at any desired angle from ten to forty-five degrees; the greater the tilt the more pronounced the distortion. During exposure the easel, of course, must be maintained securely in its tilted position by being propped up with a book or similar object. Don't try to hold it with your hand. Or you can buy a jigger known as an easel-tilter.

It is important to note that your enlarging lens should be stopped down to its smallest opening for this sort of work. The reason is that your paper is at a slant, with

(Page 94, please)

SHOOTING *the* STARS



SATURN WITH ITS MYSTERIOUS RINGS.

BY BARNARD, WILSON OBSERVATORY

By Herbert C. McKay, F. R. P. S.

YOUR miniature camera is like a tremendously charged bomb, with latent power packed into every cranny of its tiny frame. To hold it unwittingly in your hand it would seem a slight and puny instrument, incapable of any profound effect — as would also a bomb if you happened to mistake it for a grapefruit. But, unlike the bomb, the minicam's supercharge is creative rather than destructive.

With our minicam we have explored the infinitesimal world of microbes, have reduced ourselves to the size of insects and photographed them on their own levels. Yet we have barely skimmed the surface of our camera's powers. For as easily as it could explore the sub-visible world, it can

carry us out into the realm of unimaginable distances, to worlds so far away that their very light takes centuries to reach us.

There is probably no greater thrill in all photography than the moment when you first point your camera at a far-off star and imprison the tiny beam of its light on the sensitive emulsion behind your lens. That speck of illumination coming finally to rest on your film may have started on its journey moments, days, years or even eons ago when perhaps not even the world on which you dwell

had yet been formed.

You are working at night, in the quiet of a rooftop or the stillness of an open field. Around and above you is arched the dome of the heavens pierced with myriad points of light. Under such

Roam the stars and the far-off planets with your minicam. You don't need a twenty-inch telescope to get pictures of the moon, stars and comets. Even an average pair of binoculars are enough to give you superb shots different from any you have ever before taken. The author of *Trapping Miniature Monsters* (October Minicam) takes you this time on an astral voyage.



Fig. 1.—The Moon, aged 9¼ days. As detailed in the text, the Moon is one of the easiest heavenly bodies to photograph. What appear as little depressions in the surface are in reality tremendous craters. This and other accompanying pictures with this article not otherwise credited are from the Yerkes Observatory.



Fig. 2.—The Moon, now aged to 16 days. Pictures comparable to this can be made with your minicam in an amateur telescope or spotting scope. For exposure times consult the table of Moon shots.

circumstances and in such surroundings it is not difficult for the imagination to vault the bounds of the earth and take flight, if only momentarily, into the vastness of outer space.

Right above you, so close you could almost touch it, is the moon, Luna herself. Because operating conditions and results are more familiar, we would do well to make her the subject of our first, tentative exploration. Later we can venture among conditions which are strange and achieve results which will seem to contradict the basic rules of photography as we know them.

In the first place, we shall start out with the assumption that you do not own any astronomical equipment. You will

need, in addition to your camera, a small telescope of fair quality or a spotting scope. Even a pair of good binoculars or a telephoto lens of considerable focal length, say 12 cm. or greater, will do. You can buy, with a bit of shopping, a satisfactory telescope anywhere from \$10 up to as much as you care to pay.

Joining up the camera and telescope is the first problem and it need not detain us long. If both camera and supplementary glass are focused for infinity, they can be lined up without further ado since any camera so focused can be success-

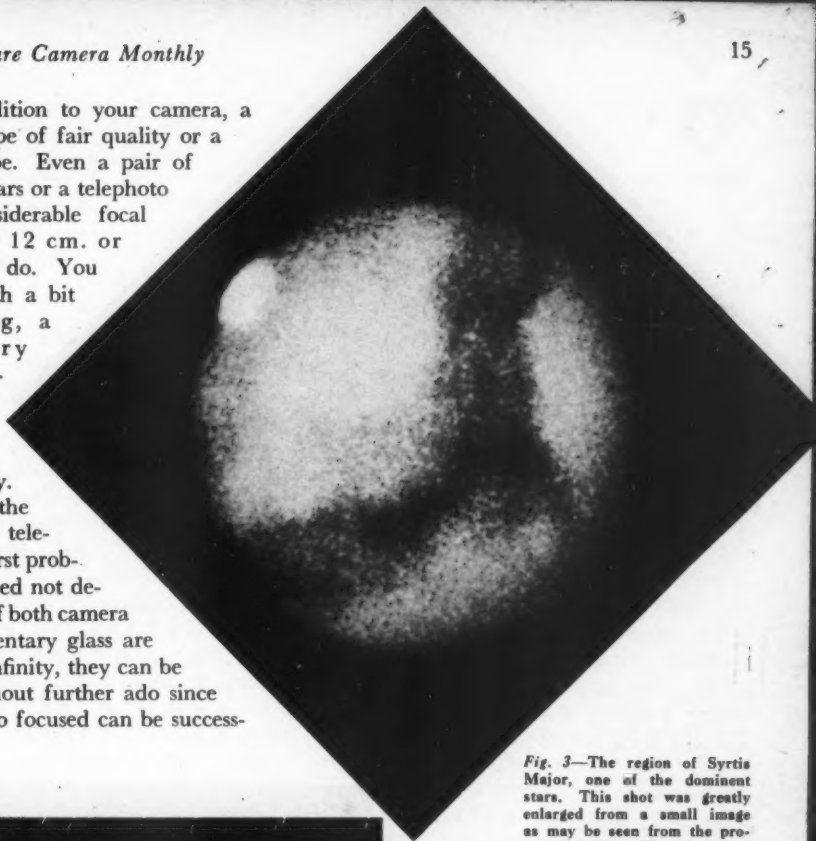


Fig. 3—The region of Syrtis Major, one of the dominant stars. This shot was greatly enlarged from a small image as may be seen from the pronounced blur. The clarity of star shots will depend on the amount of motion that can be

tolerated and may be determined from Mr. McKay's table printed with this article.



fully used with any optical instrument correspondingly adjusted. Another, and more precise method, is to use a micro adapter or a reproduction adapter and focus the image from the eyepiece of the telescope directly upon the film. Either way you will get an acceptable image.

Any dealer stocks heavy flash clamps. These, with a connecting bar, will make a temporary camera support which will move with the

Fig. 4—Comet Finsler photographed with a Leica. Exposure was three hours at $f/2$ with the camera on an astronomical mounting. Note in this picture the circular motion effect of the other stars in the heavens, explained in detail in the main body of the text. Credit: G. W. Wares and Yerkes Observatory.

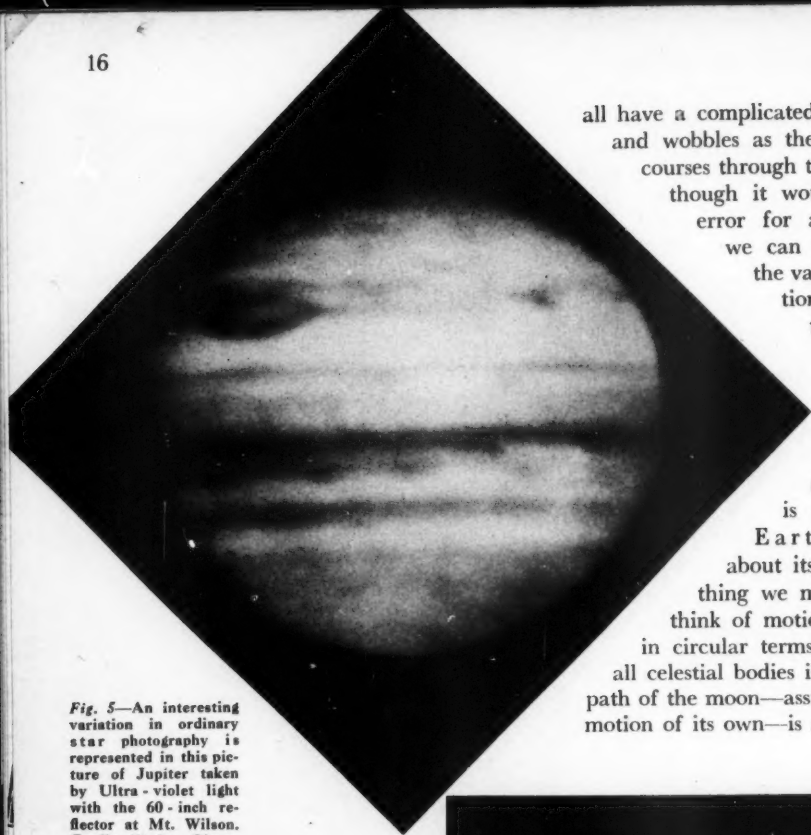


Fig. 5—An interesting variation in ordinary star photography is represented in this picture of Jupiter taken by Ultra - violet light with the 60 - inch reflector at Mt. Wilson. Credit: Yerkes Observatory.

all have a complicated set of wiggles and wobbles as they pursue their courses through the heavens. Although it would be a fatal error for an astronomer, we can blandly ignore the various fancy motions and assume that the only motion is that which we apparently see in the fixed stars and which is caused by the Earth's rotation about its axis. Another thing we must learn is to think of motion and velocity in circular terms. The path of all celestial bodies is circular. The path of the moon—assuming it has no motion of its own—is a circle divided

telescope. There are so many satisfactory ways of connecting the two instruments that you will have little difficulty in solving this problem. Even two tripods will do in an emergency.

IN photographing celestial objects, two main factors must be considered; first, the motion of the object, and, second, its brightness. We must give long enough exposure to make the record on the film, yet not so long as to permit of any blur due to motion of the body. Now the moon, sun, planets and stars

Fig. 6—Halley's Comet, the most spectacular of all the sky wanderers. The second picture at the right is not a traveling companion or even reflection. Two exposures were made on the same plate. Taken at Santiago. Credit: Ewing Galloway, N. Y.



into 360 degrees. Each degree is further divided into 60 minutes and each minute into 60 seconds. But do not confuse the minutes and seconds of "arc" with those of time. As we have 360 degrees in a circle produced by the 24-hour rotation of the Earth, it is obvious that 15 degrees of the travel are completed each hour of time, giving 360 degrees for the 24 hours. Carrying this farther, we have one degree in four minutes, or one minute of arc passed *every four seconds*.

Shorn of the mathematics, this means that if we give an exposure of one second, every celestial body will move through a quarter of a minute or fifteen seconds of arc. This is essential information for us. Now all we need to know is the relative sizes of the bodies being photographed and this we get from tables which appear later.

Now we naturally want the least possible blur in our picture. A blur of 1/50th of an inch is acceptable for contact prints. If we enlarge, it must be proportionately less so that for a ten diameter enlargement it should be no more than 1/500th. Calculating the size of the moon and taking into consideration its motion, we find that for a permissible error of 1/50th of an inch our maximum exposure with a one-inch image is 2.49 seconds.

The following table gives the maximum exposure permissible for five different image sizes, each to show approximately an error of 1/50th due to the motion of the Moon.

TABLE 1

Image Diameter	Percentage of Blur	Exposure
1 inch	2%	2½ seconds
2 inches	1%	1¼ seconds
4 inches	½%	½ second
8 inches	¼%	1/5 second
16 inches	⅛%	1/5 second

It is plain from the foregoing that shorter exposures are preferable if you can make a negative with less. The use of super-sensitive film is advisable. In the average camera the entire image of the Moon remains within the limits of the film for a maximum of four minutes. In case a full frame image is obtained, it remains in position for proper photography

less than ten seconds. Therefore you must work fast.

LET us for a time ignore the Moon and turn to the Sun. Its diameter is substantially the same as the Moon's, so we may assume the same exposures and stopping of motion will apply equally well. However, here the comparison ends. Sun photography requires the slowest of films as well as some way to eliminate some of the super-abundance of light. Dense natural screens may be used over the smallest possible aperture but some image distortion is likely to occur.

A better plan is to obtain a sheet of plane polished glass at least 50% greater in diameter than the object glass of the instrument. This is attached to the object end of the scope and turned to reflect the Sun's image into the glass. Because of the possibility of double image, two sheets of glass sealed in a thin wedge, with oil in between, are even more effective.

Canada balsam or cedar wood oil will work. Whichever method is used, however, it is essential to keep the greater part of the Sun's rays from entering the telescope. The 6% of light which an unsilvered glass will reflect back into the scope is quite ample. **WARNING:** There is danger of ruining the camera if the full intensity of the Sun's light is focused in it, and often the film will ignite. *To look into a strong glass trained upon the sun is almost certain to cause temporary blindness!* In short, if you photograph the sun, approach it with circumspection and all due respect.

Less dangerous, and on the whole more satisfactory, is working with the smaller bodies, the planets and larger stars. However, before we start worrying about their relative sizes, it is important for us to visualize these sizes in terms of our camera image. For that purpose we conduct a little experiment.

Set up your outfit and carefully locate in the finder one object on each side of the frame about eight feet distant. Place a sheet of paper on a board and near one edge of the board stick an upright pin through the paper. Now place the board just where the camera was and sight

across the pin toward each of these two objects. Place pins to indicate the line of sight. You need now a small protractor, an instrument used to measure angles and which you can purchase at any stationer's for a few cents. Measure the angle provided by the pins and you will have, roughly, the included angle of your outfit.

For example, the average 2" lens gives an angle of 45 degrees, an 85 mm. lens, 28 degrees, a 135 cm. lens, 18.4 degrees, and an 18 cm. lens, 13.6 degrees. As this angle is for a frame length of 1½ inches on 35-mm. film, we must take two-thirds of it for the narrow width, which gives us:

50 mm.....	30 degrees
85 mm.....	18 degrees 40 minutes
135 mm.....	12 degrees 8 minutes
180 mm.....	9 degrees 4 minutes
300 mm.....	5 degrees
500 mm.....	3 degrees

Now, as we could fit practically two "Moons" to a degree, we could get 60, 36, 24, 18, 10, and 6 moons respectively, to the inch-wide frame with the varying focal length lenses. To get an image one inch wide, the magnification in enlarging must be of the same order. This is within the power of the 135 mm. or longer lens though a telescope or binocular will do it better. With a rifle range "spotting scope" it is easy to get a good image one inch wide, while an amateur astro telescope will give an image up to six inches. Naturally, this means that the 1x1½ inch film frame will contain only a small portion of the surface of the moon.

Getting back to the planets, we can readily establish a table of relative sizes in terms of fractions of the Moon's diameter. Of course, the planets are immensely larger than the moon, but we are only concerned with their angular size which determines their camera image size.

TABLE 2

Planet	Angular Size in Seconds of Arc	Size Proportion to the Moon
Mercury	5" to 13"	1/374 to 1/144 Moon
Venus	11" to 67"	1/170 to 1/28 Moon
Mars	3.6" to 25"	1/517 to 1/75 Moon
Jupiter	32" to 50"	1/50 to 1/37 Moon
Saturn	14" to 20"	1/133 to 1/93 Moon
Uranus	4"	1/466 Moon
Neptune	2.6"	1/718 Moon

Assuming the use of a telescope giving a one inch image of the Moon, and assuming that we are able to make 20 diameter enlargements of the Moon, we would then get the following image sizes:

TABLE 3

Planet	Image Size	Print Size In Twenty Diameter Enlargement
Mercury	1/374-1/144	1/19 to 1/17"
Venus	1/170-1/28	⅛ to 1¼ (about ⅜)"
Mars	1/517-1/75	1/27 to ¼ plus
Jupiter	1/50-1/37	0.4 to 0.5 approximately
Saturn	1/133-1/93	1/7 to ¼ approximately
Uranus	1/466	1/23
Neptune	1/718	1/35

For convenience in locating the planets, the monthly Sky Map issued by Leon Barritt, 244 Adams Street, Brooklyn, N. Y., may be consulted.

Moon and planet photography do not constitute all of sky roving, however. There is plenty of fun available for those who do not care to bother even with the limited amount of mathematics necessary to "stop" the motion of the various moving bodies. Here is one very effective stunt that far from requiring a telescope or other high-powered objective *must* be done with the low power of a 135 mm. or shorter focal length lens. It consists of a short time exposure of an expanse of the heavens, giving the arc paths of all the brightest stars.

The camera is trained upon some part of the heavens filled with bright stars. By leaving the shutter open for various lengths of time, all the way from fifteen minutes to all night, a great variety of star paths can be observed at different seasons of the year. With a 135 mm. lens, you can get in three hours the full path of the stars which are just entering the field at the start of the exposure. Proportionately shorter exposure will give paths of shorter degree.

If the camera is pointed at the North Star, you can leave it open all night and get a remarkably pretty semi-circular pattern, each star giving a half-circle. Naturally, the general pattern will be circular except where (or if) it is cut by the horizon.

ALL of us are familiar with the phenomenon of shooting stars. These are in reality meteors which have entered the Earth's orbit and have become incandes-

(Page 32, please)

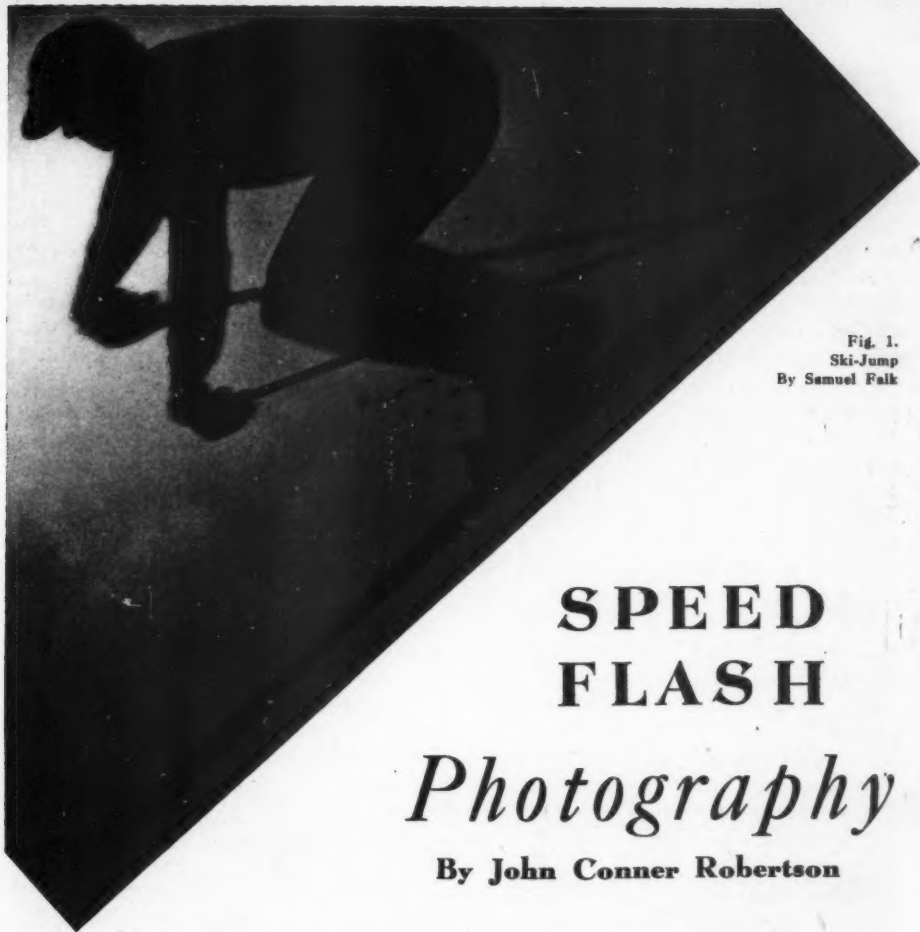


Fig. 1.
Ski-Jump
By Samuel Falk

SPEED FLASH

Photography

By John Conner Robertson

Do you want action pictures under all sorts of light conditions? Would you like to double the working speed of your lens? Modern flashlight photography provides the answer. Completely different, as fresh as this morning's news—here is an article that will open your eyes to the possibilities of “impossible” shots now within the range of any minicam.

WHEN you see the word “Flashlight”, you may be inclined to say, “Ho hum, old stuff.” But don’t say it. Flashlight has come of age. Bulbs employing an altogether new principle, synchronizers, experiments with new techniques, have so completely changed the situation that, unless you are one of a comparatively small group you can safely presume you know nothing about flash-photography.

This is what a modern flashlight will do: it will take your slow-speed camera equip-

ped with $f4.5$ or even $f6.3$ lens and give you shots you’d normally have difficulty getting at $f1.5$. It will enable you to go out on dreary, gray days and get pictures with good uniform illumination. It will enable you to get superb daylight shots of those cockeyed scenes where one part is blazing with light and another is in deep shadow. You can control backgrounds, subduing them from your main interest, in daylight or at night. Now, do you still think flashlight is old stuff?

You've probably taken them or been an unwilling witness at one of those old time flash sessions. You set the camera up on a tripod and then spent twenty minutes trying to persuade the girl over in the corner to stop her hysterical giggling. The boys sat around hoping they didn't look as scared as they felt. You probably didn't feel so good yourself. You screwed the flashbulb into a lampstand pressed into service. You opened the camera on time and warned everybody to hold it, then pulled the light socket. If the bulb fired, you closed the shutter. If it didn't, you had the whole job to do over.

Those days are history. Today your flash unit is part of your camera. You can shoot at any speed of which your shutter is capable, 1/50th, 1/1250th, it makes no difference. When you fire the shutter you fire the flash. It's all simultaneous and it isn't done with mirrors, either.

The changes brought about by synchronized flash are enormous. But before we discuss what it can do, let's take a glance

at the synchronizer itself. The whole unit is a gadget small enough to hold in one hand and weighing only a pound. You don't need a power plant twenty miles away to operate it. One small battery of the kind used in flashlight lamps suffices, and with ordinary use will last as long as six months.

The flash bulb, about which more presently, screws into a socket in the synchronizer unit which comes equipped with a reflector. The whole works is attached, in less time than it takes to describe, to the side or top of your minicam as shown in Fig. 7 & 8. It removes just as easily and there you are. One of the most popular of the minicam synchronizers, of which there are many, is the Kalart which can be used with over thirty different camera types, including focal plane shutter cameras such as the Contax, Leica and the Super Nettel. In most cases, no special fitting is required. The cost is low, under twelve dollars. Other makes are available at a variety of prices. Your local dealer will be glad to demon-

EN ROUTE

This remarkable shot is an example of what speed flash photography will do on a murky day when ordinary means would fail to produce a worth while picture. One flash bulb in kalart synchronizer was used at camera position and served to bring up the detail. Note the powerful cloud effect, a characteristic of speed flash photography. Exposure 1/200 at f/16.

BY SAMUEL FALK





DANCE ON SKATES

BY SAMUEL FALK

Fig. 3. Taken with a single flashlight used with a Kalart synchronizer this brilliant shot won honorable mention at the Fourth International Salon. Taken at Madison Square Garden from a ring box, about twelve feet from the performer. Exposure was $1/200\text{th}$ at $f/11$ with a Superflash bulb, Super Sensitive Pan. The clarity of the shot is due to catching the picture at the exact moment of suspended action.

strate them.

Flashlight photography was an uncertain, limited business until the advent of modern flash bulbs. There are two types, the foil lamp in which layers of aluminum and oxygen under pressure burn to produce the light. The Photoflash is of this variety. The second, or Superflash bulb, recently developed by the Wabash Photolamp Corp., contains a fluffed wire which burns with tremendous intensity. On top of the bulb is a small blue spot. If the spot turns pink at any time before the bulb is used it is a sign that air has entered and serves as a warning against its use. In that case, the bulb can be exchanged.

The advantage of the Superflash bulb is much more than its warning spot. Its revolutionary nature lies in the greater duration of the flash at maximum intensity. Normally, a flash lasts about $1/30\text{th}$ of a second. Actually, however, this includes what might be called a "fade-in" and "fade-out" period which is of no value. Thus working time of the flash is reduced to about $1/200\text{th}$. If you set your shutter at any speed slower than $1/200\text{th}$ you get uneven illumination, some parts of the picture light, others dark.

Various tricks were tried including firing off two or more bulbs at staggered intervals, but nothing really worked at maximum effectiveness until the advent of the

Superflash bulb with its new type of light source that gave what for all practical purposes constitutes even illumination over the entire flash period. Since this is an article on what a modern flashlight will do, rather than how it does it, readers interested in pursuing further the theory and mechanics of the new type bulb are referred to the manufacturer who offers free descriptive literature.

THE first advantage of a synchronizing unit and a maximum efficiency bulb is immediately apparent. The number of cameras equipped with ultra-speed lenses is limited. The average small camera with a maximum aperture of $f4.5$ has hitherto been under a sore handicap when working with rapid moving subjects. Compromise in shutter speed is, of course, not possible, beyond well-defined limits as set forth in H. Crowell Pepper's thorough analysis of the speed of moving objects. (*Speed Photography with Low Priced Cameras*, MINICAM, October.) It therefore follows that the working value of the lens must be increased without sacrificing shutter speed. Increased illumination during the exposure is the solution.

Samuel Falk's dynamic *Dance on Skates*, Fig. 3, is an example of the new

synchro-flash technique. The sole illumination, other than the flash, was a single spotlight which would have made this particular shot difficult, if not impossible, with the fastest lens. With the flash, it was taken at $1/200\text{th}$ at $f4.5$!

Only coordinated flash could get pictures such as this or the extraordinary *Ski-Jump* shown at the head of this article. With the flash unit synchronized to the shutter, you need only to determine your shutter speed — which will generally be all you have got — follow the action, and at the right moment, press the cable release. To get the picture with a separate flash unit and hope for any degree of success with such fast action and high shutter speeds, would be unthinkable. A synchronized flash unit makes every small camera the equivalent of a press photographer's outfit!

There are two basic shutter types built into modern miniature cameras, the iris type of which the Compur is the best known example, and the focal plane type as in the Contax and Leica. The following exposure tables for cameras equipped with Compur and focal plane type of shutters should be followed for best results with speed-flash photography.



WAITING FOR SUPPER

BY JACK LAYER

Fig. 4. Photographing any animal within the dark recesses of its cage is a problem that only the use of Kalart synchronized flashlight could solve. This action shot was caught by the N. Y. Journal's alert photographer, Jack Layer, with a Contax shooting $1/200\text{th}$ of a second at $f4$. Mr. Layer was on the right side of the bars which, judging from Leo's expression was the wrong one.



Fig. 5. Portrait of Alice. A perfect example of Synchro-Sunlight Photography. The picture was made on a bright June day at 1/50th at *f*9 on Panatomic Film with a K-2 filter on the lens. One No. 20 Photoflash bulb was fired with the Kalart Speed Flash fifteen feet from the subject. Note the backlight on the hair and arms, a typical effect of this type of photography.

Table 1. For Focal Plane Shutters Only
One Superflash Bulb No. 2 in Synchronizer

Distance	Shutter Speed 1/50th-1/250th	Shutter Speed 1/500th-1/1250th
10 feet	<i>f</i> 8	<i>f</i> 5.6
15 feet	<i>f</i> 5.6	<i>f</i> 4.5
20 feet	<i>f</i> 4.5	<i>f</i> 3.5
25 feet	<i>f</i> 3.5	<i>f</i> 2.8

Table 2. For Compur Type Shutters Only
One Flashbulb in Synchronizer with
Verichrome Type Film Only

LENS STOP TO USE		
Distance	Standard No. 20	Baby Size
Lamp to Subject	1/100 or 1/200 Sec.	No. 10 1/100 Sec.
6 feet	<i>f</i> 16	<i>f</i> 11
10 feet	<i>f</i> 11	<i>f</i> 8
15 feet	<i>f</i> 8	<i>f</i> 6.3
20 feet	<i>f</i> 6.3	<i>f</i> 4.5
25 feet	<i>f</i> 4.5	<i>f</i> 3.5
One Stop Smaller May Be Used for Exposures on S. S. Pan or Similar Extra Fast Film		

In speed-flash photography there is one important point to bear in mind. Your flash will give you the extra boost in illumination to enable you to get your shot at a comparatively slow *lens* speed. However, it has nothing to do with stopping the motion of your subject. For this you must rely on shutter speed which must be fast enough to "stop" action as set forth in the tables in Mr. Pepper's article, mentioned earlier.

If flashlight did nothing more than has already been described, its value would be fully justified. But it goes much further. We spoke about getting pictures on gray, drab days when normal judgment would suggest leaving the camera home. The problem here is not lack of illumination which, with average subjects could be compensated for by somewhat longer exposure. The trouble, as experience has shown, is that the pictures so obtained will be muddy and dreary looking, lacking any contrast or snap.



CONVERSATION

BY SAM MELLOR

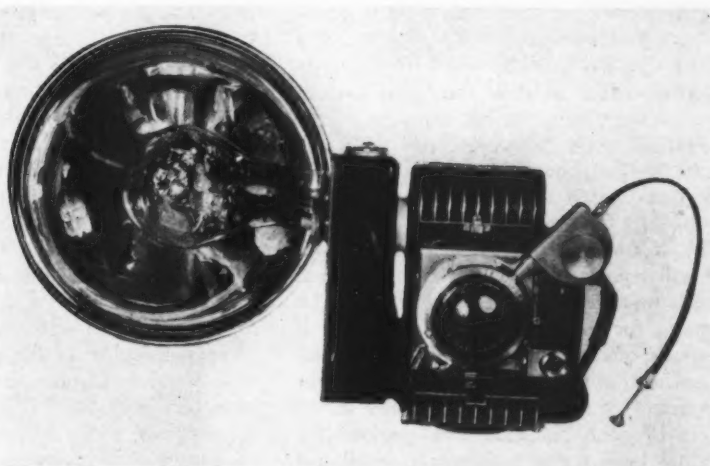
Fig. 6. This charming, impromptu study was made possible through the use of synchronized flash. One \$2 Super-flash bulb was used in synchronizer attached to the camera. No supplementary illumination was used which accounts for the dark background. The action was caught in 1/200th of a second at $f/8$ on Super Sensitive Pan. Distance was about eight feet.

IN cloudy weather, illumination is so diffused and characterless, that there is not sufficient difference between the tonal values of various objects to make a good picture. At this point, flashlight technique enters by providing its own light. The exposure problem is really no problem at all. The time of day and the state of the weather can, for once, be ignored. Simply set your shutter speed at 1/100th or 1/200th, depending on whether or not you have any moving object in the foreground. Your lens opening will be determined by how much depth you want in your subject — the greater the depth, the smaller the opening and *vice versa*. Thereafter, you need only glance at the proper table to gauge your proper

working distance from your subject. Or, if the distance at which you must work is fixed for one reason or another, the lens opening becomes then the variable which is determined from the same simple table.

Enough has been written to fill several stout volumes on how to take pictures of scenes in which there is *too much light in some parts and not enough in others*. As is well known, film emulsions can render truthfully only a limited tonal range. When the brightness range exceeds this limit something has to give. If exposure is made for proper rendering of the high-light areas, the shadows will be inky and completely devoid of detail. If, on the other hand, exposure is made for the

Fig. 7. Kalart Speed Flash synchronizer fitted to Kodak Bantam camera.



shadows, the highlights will be chalky and burned out. A common example of this predicament is the woodland scene with dark, shaded trees and brilliant patches of sunlight.

Flash photography provides a solution impossible to obtain any other way. Briefly, the function of the flash is to increase the shadow illumination enough to bring these areas within the tonal range the emulsion is capable of recording. By stepping up the illumination of the shadowed areas, the ratio between deepest shadow and greatest highlight is decreased to the point where an exposure that will show

detail in both highlights and shadows is made possible.

The procedure for such pictures is as follows: The position of the camera should be such that the flash will illuminate the shadow area rather than augment the highlight which is already too strong. Having determined the lens opening at which you desire to work — depending upon the depth of focus desired in the picture or the camera distance from the shadow area — set the shutter speed at what would normally be correct for proper rendering of the highlight. For this purpose, a good exposure meter, either of the

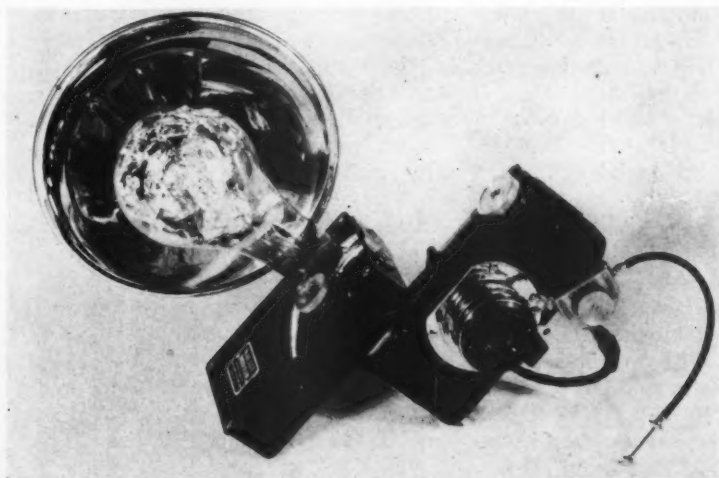


Fig. 8. Kalart Speed Flash fitted to Argus camera.

photo-electric or extinction type is advisable. You can ignore the shadow area since this will be illuminated by the flash.

If you had no flash unit your camera would not give a correct exposure of the highlight area. However, the flash will raise the brightness factor of the shadow portions within the recording capacity of your film and the end result will be a fine, balanced picture. Curiously enough, it will seldom be apparent from the final print that any artificial aid was used. The reason for this is that the human eye is capable of recording a much greater variation in brightness than is the film in your camera. A forest scene in which leaves sprayed with sunshine and shaded tree trunks both reveal satisfactory detail will not excite comment from the average beholder because that is the way his eyes would have recorded the scene had he been there! Your flash, therefore, far from creating an artificial effect has merely aided your picture to approximate truth in terms of human experience.

From this very practical use of the flashlight, what amounts almost to a new phase of photography has been synchronized with sunlight to produce startling effective shots hitherto restricted to the studio.

Some of the most beautiful effects of indoor, controlled lighting are back and top-lighting, evidenced in highlights on the hair of subjects and clear detail in both back and foreground objects. In normal outdoor photography, this has rarely been possible. Distant objects, reflecting much light require shorter exposure which, if given, would result in under-exposure of foreground objects or figures. Synchro-sunlight has provided the solution.

In Fig. 5, "Portrait of Alice", is an excellent example of this new technique. Note the beautiful cloud effects, a characteristic of this type of work which permits recording of a brilliant sky equally well with the minute detail in the girl's costume and the tree trunk. Extraordinary as it may seem, no after-manipulation of the print was resorted to in order to achieve the crisp quality shown in the picture. Flashlight did it all! "Dog Team", shown

in Fig. 2, is a perfect example of a photographic masterpiece snapped through the aid of flashlight on a day so generally dull and gray that an ordinary picture would have been flat and muddy. The unusual cloud effect was captured perfectly and without any sacrifice in the figures of dogs.

When synchro-sunlight pictures are to be made, the camera should be pointed in the general direction of the illumination though not directly into the sun. Shutter speed should be set for the distant portion of the picture in which you want to preserve detail. As in the previous case of too-long scale pictures, the flash will provide the foreground illumination. Again an exposure meter will simplify the task of determining proper exposure.

With this technique, distant hills, landscapes, clouds, seascapes and other types of valuable backgrounds which would be grossly over-exposed in a straight snapshot will be reproduced with amazing clarity. The technique lends itself to an infinite number of variations secured by changing the position of the camera in relation to the sunlight source. The small lens opening that the flash makes possible is a contributory factor in producing great depth of focus which, in turn, gives that much-prized three-dimensional effect in pictures.

One important point must be kept in mind. For various types of cloud effects you will, of course, use filters as explained elsewhere in this issue. Normally, a filter factor can be compensated for either by adjusting the lens opening or by varying the shutter speed. In flash photography, the shutter speed must be kept a constant, in direct relationship to the size of the flash bulb and the distance of the object. *Therefore, filter compensation must always be made by changing the lens opening or varying the object distance, rather than the shutter speed.*

Synchronizing units are by no means limited to camera attachment. A great variety of indoor effects from flashlight, or flashlight in conjunction with Photo-flood illumination is possible. To overcome the somewhat hard, flat lighting
(Page 98, please)

AUTUMN WOODS

Photography

By Samuel Brown

Take a trip through the country with a lens veteran who tells how he gets his pictures.



YOU say you want to do some autumn woods photography? By all means, friend, go right ahead. I consider it a splendid idea. You've picked the perfect time of year, not too hot, not too cold. The leaves are in their final burst of glory, golds and browns and every imaginable color in between. Whether in natural color or monochrome, you're going to get some excellent pictures. I wouldn't mind going myself.

You say you want some advice? What kind of advice, friend? You're not thinking of getting a special camera just for some autumn pictures, are you? That's carrying specialization a bit too far. Exposure and so on, eh? Well, I'll tell you what. Instead of filling you with a lot of advice you'll probably forget before you've gone half a mile, how would you like to

Fig. 1. Autumn Morning. Notice the halo of light about the heads of the mother and child. This shot is proof that the old saying, "Never shoot into the light" can sometimes be safely discarded. A lens shade is an essential for successful pictures of this type. Taken at 1/25th at f8 on Eastman Super Sensitive Pan film. A K-1 filter was used.

take a trip with me? You can lug the accessories and the tripod and fill in where we need an extra figure in the landscape and, in return, I'll explain what we're doing as we go along . . .

I know it's early, friend, but remember, this started out as your idea. Early morning, before the sun's too high, stifling all the shadows and drying up the leaves will give us some of our best shots. Around mid-day, when there's a uniform glare over the landscape, we can knock off and catch up on some of the sleep we lost this morning.

Right ahead there, in that little clearing, is our first shot. The sun slanting down on the trees filters through the branches and lights up the dust in the air. Sunbeams raining from the sky! This is an easy shot, we won't even need a filter. Go right up to one of those trees and take a reading off the exposure meter. It wouldn't do to take a reading from the camera position, you know, because that wouldn't give us a true value. Always go right up to the principal object you are photographing and take a reading directly from its surface. And keep the meter pointed away from those sunbeams. We want the reading right off the bark.

You say it shows $1/25$ th at $f 16$? Sounds right to me. We'll use the tripod on such a slow exposure to prevent wobble from getting into our shot. An aperture as small as $f 16$ will give us plenty of depth of focus which is important in these woods pictures. Wouldn't do to have the background soupy. Now let's tilt the camera up just a bit to include a piece of sky.

Otherwise we'll have too many unrelieved dark masses. Ready? Shoot! Let's call that Fig. 4 for future reference.

Don't be in too much of a hurry, friend. That was a swell shot but there will be others just as good or better. Let's not shoot the works all at once. There's a country road down along here someplace. No, you carry the tripod. A bargain is a bargain. Look at those dull reds in the leaves. We'll need our filters, either the yellow or the green, to record them in their true monochrome values.

Here we are. Perfect, just as I thought. Our filter will give us those swell cloud effects as well as correcting color values. Ask those girls down there whether they'll be good enough to stay there long enough to be included in our scene. Most landscapes look empty and forlorn without a human figure or two to set the scale and

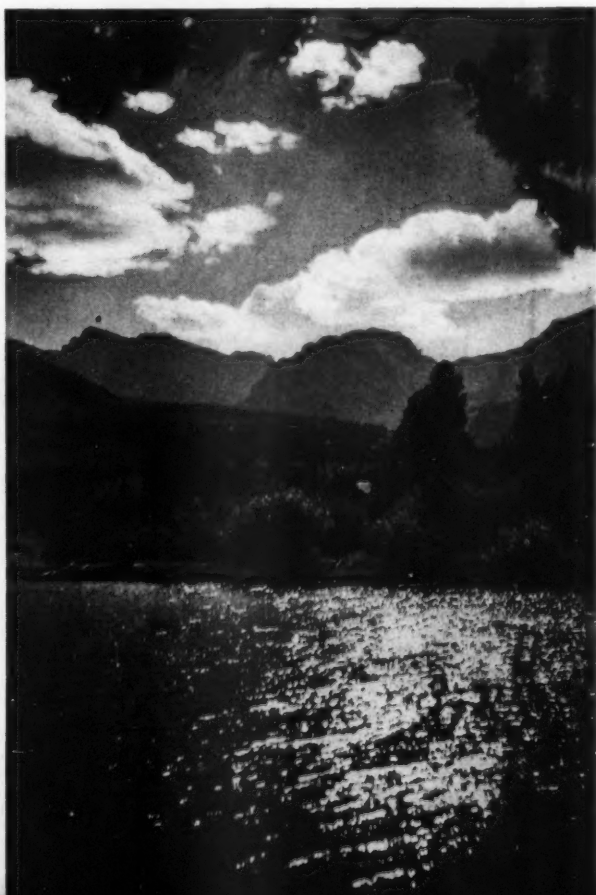


Fig. 2. Distance Peaks. The exposure was $1/30$ th at $f 16$. See text for how this exposure was arrived at from an initial reading that showed $1/200$ th as average exposure. A medium yellow 3-X filter was used to cut haze and accent the clouds.

break up the monotony.

The girls don't mind? Fine. Let's get busy. Did you take a reading while you were down there? Good, you're learning fast. It was $1/100$ at $f8$? That means we'll shoot at $1/50\text{th}$ because our No. 2 Orthocolor yellow filter has a two times exposure factor. We could have opened our lens one stop wider instead of electing to shoot at a slower speed but that would have meant losing depth of focus. Since we've got a tripod we are better off to cut down our shutter speed and leave the lens opening constant. That's our Figure 5.

Let's follow the road a ways. Those tall trees on either side offer possibilities. What we want, though, is some real human interest. I know I said we'd use you, but I meant in an emergency. Now that lady with the baby down there. That's what we want. Try your diplomacy on her. Tell her we'll send her one of the prints if she'll pose. That always works. She will? Good.

Now observe this closely. The sun is behind them and facing towards the camera which means we are going to have a swell example of backlighting. Our background will be a trifle over-exposed since we will take our reading from the figures in the picture, but we'll get a beautiful halo ef-

fect around the hair of our subjects and a sort of mystic quality in our picture that no other sort of lighting can catch.

Make sure the lens shade is over the lens and it might even be a good idea to hold your hand over the top of the lens to shade it from stray light rays coming from above. A light yellow filter will serve a double purpose here, first, to cut down the volume of light and second, to give us true rendering of the leaves. A K-1 yellow will be about right, but just for safety's sake we'll shoot it with the filter and without. Since our reading shows $1/50\text{th}$ at $f8$ we cut the exposure in half for the filter factor giving us $1/25\text{th}$ at $f8$ as our actual exposure for our Figure 1.

Since we were shooting into the light and took our reading from the people in our picture we can't expect much detail in the leaves, which will show mostly in silhouette or the sky which, of course, will be over-exposed despite our filter. So let's move down the road a bit toward that bend when the light is more uniform and try another shot with tree detail as our objective this time.

LET'S make sure we get that bend of the road into our composition. That's

Fig. 3. Recess. The exposure was $1/200\text{th}$ at $f6.3$. It could have been taken somewhat more slowly at a smaller aperture but in that case the added depth of focus would have distracted attention from the horses. By shooting at $f6.3$ the waving grass in the background was thrown out of focus and a distraction removed.



Fig. 4. October Sun. The sunlight streaming through the leaves is the chief charm of this woodland scene. Exposure $1/25\text{th}$ at $f\ 16$ on Eastman Super Sensitive Pan film.

always a good effect. Now for our reading, carefully, for maximum detail in that big tree trunk. I think a Kodak Sky Filter would be perfect for this shot. Now let's move the camera a bit to get our road wandering into the picture from the right and to eliminate that other big tree on the right. It wouldn't do to have two main points of interest in a single shot. A picture should lead the idea right up to its principal object. Now the road curving from right to left goes right up to the tree and the eye following it will go right up the big tree trunk for a sense of tremendous height. That is, it will if we do everything right. For our Figure 6, our exposure is $1/25\text{th}$ at $f\ 11$.

That old farmhouse up on the hill ought to be our spot for lunch. But first let's look around and see whether there's anything in the way of a picture for us. What about those horses being led up to the watering trough? We've got to work fast if we want to catch them just as they are drinking. Just a quick glance at the exposure meter and a fast shutter speed since we won't have time to fiddle with the tripod this time. You say we can get it at $1/200\text{th}$ of a second at $f\ 6.3$? Fine. Notice that we use a low camera position here, not exactly a worm's eye view, but what we might call a horse's eye view, the camera held about level with their bent heads.



If we shot down at them we would get a foreshortened effect and we certainly wouldn't want that. Got it? Mark it Figure 3. Good, now for that lunch and catching up on the lost sleep from this morning . . .

Well, we must be on our way. Let's climb that hill and get a good look at the mountains in the far distance, rising with majestic splendor from the deep valley below. Now there's a shot that would grace anybody's collection. Although the scene looks clear, let's not be deceived because there is an invisible haze ready to register on the film and spoil the picture.

The medium yellow filter will eliminate this. If we step back about ten feet, we can get in the branches of this overhanging tree as an effective frame for the top of

our picture. Those spots of light in the clear stream are going to reproduce as shimmer in our picture. And the clouds overhead will be captured effectively thanks to our yellow filter. Of course, we can't take a meter reading off any particular object since this is a general landscape. Instead, we hold the meter toward the mountain and get a general index of the light value. It's surprisingly greater than you thought, isn't it. Now, instead of taking the meter reading directly, we'll cut it in half first. Shots of distant landscapes or over water are always best taken thus. Now our distant mountain won't be so over-exposed as to register on the film only as a distant blur. Of course this final reading from the meter will have to be further divided to



Fig. 5. Country Road. Figures always lend charm and intimacy to a rural scene. Taken in early October on Eastman Panatomic film, exposure 1/50th at $f/8$. A No. 2 yellow filter was used.

take into account the filter factor. Our general reading shows 1/200th at $f/16$. Half of that is 1/100.

Our filter has a three times factor which means that our exposure should be 1/35th. at $f/16$. However, our camera does not have a 1/35th marking so we take the nearest *lower* marking which is 1/30th. Thus our exposure is 1/30th at $f/16$ and be sure the tripod doesn't wobble on this hillside or all of our work will have been in vain. We can call this our Figure 2.

Are we going to take any more pictures this afternoon? Certainly, friend, certainly, but you do

Fig. 6. Slim as a tree. A woodland scene is most effective when some single object, like the tall tree at the left, dominates the picture and provides a focus of interest. Taken at 1/25th at $f/11$ on Eastman Super Sensitive Pan film with Kodak Sky Filter.



the taking and figuring for a while. Then, after we have developed and printed our shots we'll check over them and determine how many of our Figure numbers came out the way we expected and, if not, why not.

I know the tripod is a bit of a nuisance but for this sort of work I consider it almost as essential as the camera itself. That and the lens shade. You see, out here in the woods most of the light we are getting is filtered through the branches and the leaves. By the time it gets to us it isn't nearly as powerful as, for example, on that hilltop we just came from. Then, too, we want to get detail in the shadow areas like tree trunks or the fallen leaves about them. That means still longer exposures. Finally, these pictures of ours are going to be enlarged pretty big. Like as not, when we start looking at them on the enlarging easel, we will want to pick out special parts for enlargement and blow those up quite big. A landscape picture has to have size before you can really appreciate it.

Under those circumstances you want your camera just as firm as you can possibly get it. The tiny traces of motion that wouldn't matter if you were making prints 4x5 inches or even 8x10, are going to show up like a case of the jitters when you start blowing up to 11x14 or bigger.

And the lens shade is equally valuable. Personally I feel that every shot that's ever taken, indoors or out would be better with a shade over the lens. If you haven't been using one, you can't imagine the difference it will make in your picture quality. You'll get sharper, clearer images, you won't be troubled with annoying light spread—what we call halation. And those into-the-sun pictures can't possibly be made any other way. Take my advice, make the use of a lens shade a habit. They're cheap and it's not as though they wear out from frequent use.

And now it's up to you. Any little thing you want to know, sing out. But in the final analysis, after all the advice has drifted into echoes, the best way to take pictures is still to go out and take them.

Shooting the Stars

(Continued from page 18)

cent with the friction of their rapid passage through the air. They flare up for anywhere from a fraction of a second to several seconds, describing a graceful arc in their flight before they are consumed or fall to earth. Large flights of meteors occur from time to time in various parts of the country, generally heralded with ample notice in the newspapers. Your minicam trained on the sky at such times will yield pictures of peerless quality. Procedure is merely to point the camera at the section of the heavens where the shooting stars have been observed or may be expected, leave the shutter open and catch the images as they scoot across the vision of your lens.

Your picture will show the star paths, depending on how long the camera was left open, but in addition, it will be punctuated with the graceful orbits of the meteors.

Comets, too, may be photographed in the same way if you will keep an eye on your daily newspaper and learn when one of the large comets is expected to become visible. Here again, the motion of the comet is not important since it is that very quality you want to catch in your picture.

Whatever your method or the technique you develop, you will soon find that stellar photography can become one of the most fascinating phases of all minicam work. The possibilities of development in the hobby are almost limitless and its rewards, in the way of increased knowledge plus first rate pictures, well repay the effort.

The Raygram Corp., 425 Fourth Avenue, New York, has just issued a booklet titled "*Development vs. Exposure*" written by Herbert C. McKay.

This booklet explains in detail why no developer is a complete processing factor in itself; there is always the influence of the exposure to be considered—how the speed rating of film changes with development; use of the step wedge; Gamma; Quality vs. fine grain.

Booklet may be had on request from Raygram Corp.

Variations In Form

By
George A. Bohnell



Fig. 1.

An understanding of basic human anatomy is as essential for the photographer as for the painter. Most human types are variations of two principal forms, the Nordic and the Latin. In this article, the first of three, Mr. Bohnell analyzes anatomy from the photographer's viewpoint.

THE art student studies his anatomy with a serious concentration second only to the tyro medico bending over his dissection table. But whereas the doctor seeks to discover the cause and cure of

human ills, the artist is concerned with the body only as the mechanical means of expressing his ideas. The living model posed before him is only his medium. The more thoroughly familiar the artist

is with the basic forms he is likely to encounter, the greater attention he can devote to what he wants to do with them. The artist who does not know his anatomy may be likened to the author who must stop to look up in the dictionary each word he uses.

To a lesser degree, a comprehension of basic human form is a requirement of good photography, whether of clothed or nude models. Lesser, because the photographer, unlike the artist, is not called upon to shape every muscle and curve of his figure. He must, however, possess sufficient knowledge to recognize the advantages and limitations of broad types in order that he may be able to determine his needs and give the most effective presentation to whatever picture he has in mind.

The problems of the photographer are both like and unlike those of the artist. They parallel those of the worker in print in that both must be readily familiar with the human forms which traditional usage has come to associate with the expression of certain ideas. Thus, the short, heavy figure has come to mean work, drudgery, servitude and, at the opposite extreme, the slim, tall figure gayety, charm, romance. Between these two extremes are a series of more or less subtle modifications which both artist and photographer must be able to use with equal facility.

Unlike the artist, the photographer must take his material pretty much as he finds it. The artist can change, soften a bad line,

alter coloring, introduce an infinite number of minute corrections which would make a photograph, similarly treated, an exposition in retouching rather than lens art. The photographer, therefore, must find his compensations in other directions. He must know, for example, that too long a leg posed on a plane toward the camera will appear shorter or that too short a line from waist to shoulder can be made to appear longer if the model leans back, away from the camera. These are minor points, cited to show the need for an understanding of basic anatomy. Whether the model is dressed in a dainty smile or swathed in six yards of red velvet does not change the problem. Below the smile or beneath the velvet, are line and mass to be arranged and shaped in such fashion as most effectively to convey that picture's message.

Arbitrary classification is a dangerous pastime for it may lead to the error of



Fig. 2. The typical dark or Latin type characterized by olive skin, dark, lustrous hair, short waist, and legs. The tilt of the head gives added piquancy to the face. This type must not be confused with the heavier and more mature figure used to portray Womanhood, as explained in the accompanying text.

easy thinking in the manner of the patriarch who proclaimed, "There's only two kinds of people — them as are with me and them as are agin me." However, with much cautious qualification we may say that humanity broadly divides into two basic types — the fair and the dark. Strictly speaking, of course, this is not true. Types emerge and blend until it is impossible to say where one begins and the other leaves off. But a picture is not a book. It must deal in simplifications. Pictorially, the price of diffusion is confusion.

CERTAIN characteristics traditionally associate with each of these types. Fig. 4 approaches the ideal of the fair, what we are pleased to call the Nordic type. We can tabulate somewhat as follows: Skin coloring fair. Hair, light, golden rather than yellow. The Hollywood influence causes the average beholder to question the more exotic hair tones. The blond who is too blond is suspect and

that would never do for our pure type. Face, rather strong, the jaw line pronounced but not square, mouth generous but not so full as to suggest the voluptuous. Eyes wide apart, deep-set and blue. Nose straight and more long than short. Shoulders definitely broad and sloping, not too sharply, to a bust which should be broad and full without being too heavy.

Our model's waist must be sizable so that the curve from waist to thigh is not too markedly rounded. Legs of generous proportions with the line from knee to foot considerably longer than average. A short line would make the body top-heavy and incompatible with its general dignity. The entire impression must be one of nobility, femininity without sexiness.

Contradistinction to the Nordic is the Latin type, Fig. 2, the essence of warmth and ardor, hinting of pent-up fires. Hair, dark brown or even black, long and thick. Skin an olive shade. Face oval with jaw and chin line softened and cheeks delicately rounded. Mouth small with lips full, bow-shaped, their color pronounced. Eyes dark, not too far apart and sparkling. Shoulders narrow, the curve emphasized. Bust should be high and deep, the breasts firm and pointed, long rather than broad, as in Fig. 3.

The brunette beauty will have a narrow waist, the curve of the thigh swelling and tapering to shapely legs, again not too long. Note in Fig. 2. The line from shoulder to waist should be somewhat shorter than from waist to foot, which latter should be small and high-arched.

The general Latin type must not be confused, as it often is, with the heavier dark figure used to portray a brooding fullness of womanhood, a favorite type



Fig. 3. The perfect example of the "Small Girl" type of figure, a more emphatic variation of the basic Latin type. Chief characteristics are the thick, black hair, the sturdy waist and shorter legs. Note the foreshortening effect of the line from shoulder to waist as the model leans toward the camera. The length of a body line can appear shorter or longer by lines which slope away from or toward the camera.

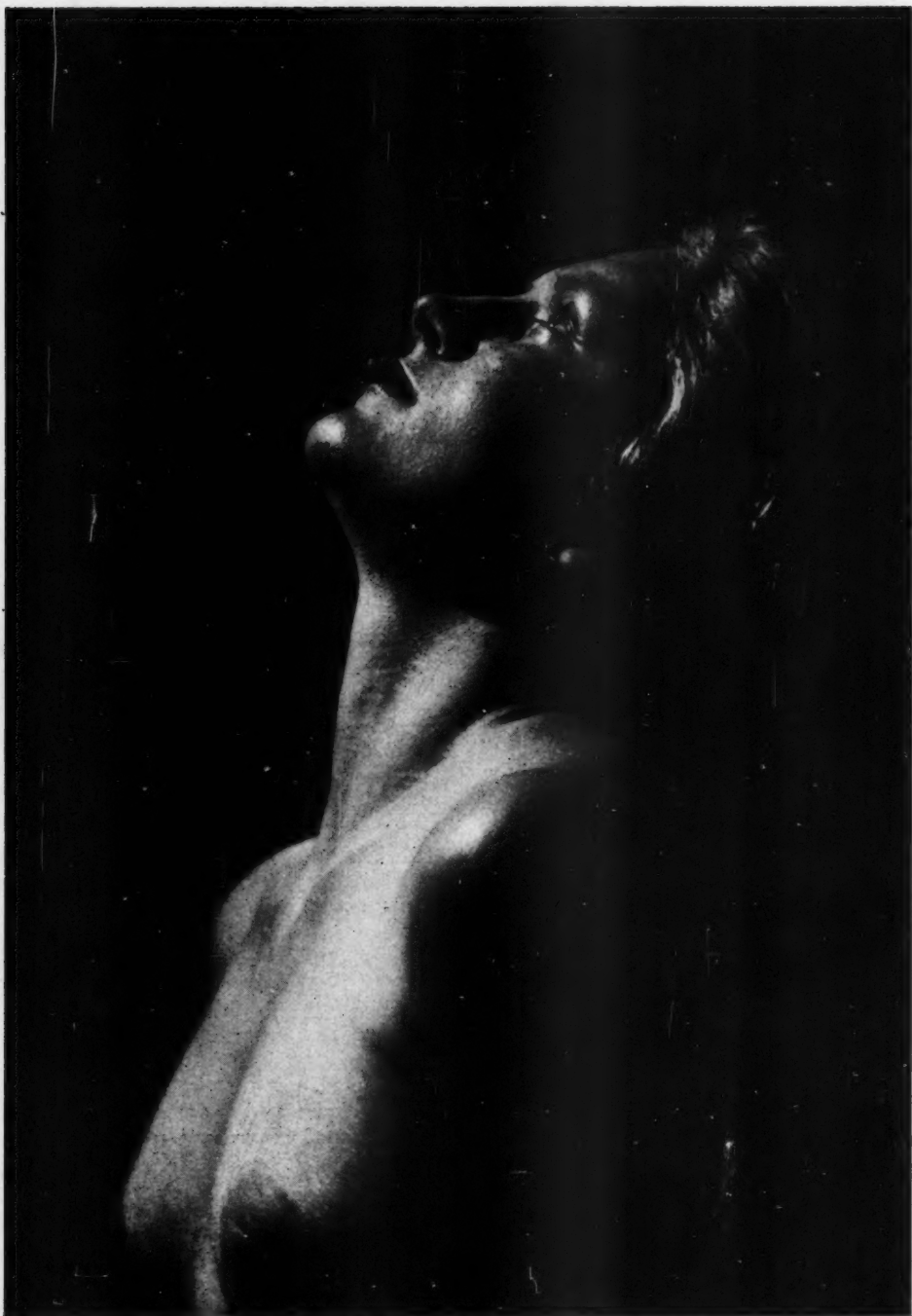


Fig. 4. The Eternal Woman. The ideal representation of the Nordic type. Distinguishing features are the classical purity of the face lines, the golden hair, the heroic proportions of shoulders and arms. The entire pose, the uptilted head and sharp line of the neck emphasize the qualities of dignity and aloofness. Note how both shadow and the tendency of camera lens to make near objects seem larger, have both been utilized to add weight to the arm facing the camera.



Fig. 5. The Siren. This is a variation of the basic Nordic type shown in Fig. 4. Features are on a smaller scale, the body slimmer and longer. This unusual picture was secured from a camera angle to one side and slightly above the model. The negative was then turned in printing to secure the desired composition.

for the depiction of despair and the various facets of sorrow. The general type tends toward the saucy, a complete awareness of its amorousness, near yet aloof. The figure, while well-modeled, should be small, no one part of the anatomy assuming undue emphasis.

Upon modifications of these two norms occur the variations in form, even the interblending of characteristics from one basic type to the other which constitute the material with which the photographer works. Thus, the brooding type, mentioned above, is the general Latin on a somewhat larger scale and with special accents designed to point out whatever

thought the photographer has in mind. More tranquil eyes, a heavier bust and fuller thighs will depict the Eternal Mother. An older face, longer body and thinner mouth will do for the representation of Jealousy. There is no reason why our Nordic goddess cannot burn with the same fires of fury, in fact, but pictorially she will not be able to convey the idea.

If with our Nordic type we whittle down the proportions somewhat, select a face with a degree less of austerity, a flatter chest and slimmer, long legs we have the perfect ideal of Athletic Womanhood. Brighten the face still more, add a carefree cut to the hair, a small high bust,



Fig. 7. Little Sister. This lovely young blond girl is every man's ideal of the typical Little Sister. Note the free-flying golden hair, youthful features, friendly smile. The large scale of the figure was secured from a "worm's eye" camera angle, shooting up at the model. Lighting has been cleverly balanced to suggest an outdoor effect.

slender waist and well-shaped long legs, and we have the Cocktail or Dancing Girl, Fig. 6. Reduce the general scale even further, eyes bigger, mouth a little fuller, bust narrower, and we have every man's ideal of Little Sister, admirably caught in Fig. 7.

Borrowed characteristics from one type to another produce a number of interesting variations with which the photographer should be acquainted. Thus, dark coloring and hair with the larger proportions of the Nordic types, are the accepted markings of a large number of peasant types, differing only in their costuming. The long, deep bosom of the Latin type with the hair and skin coloring of the Nordic is much used for a chaste, Grecian effect, particularly in bust-length pictures. The golden hair of the Nordic, sleeked down, regular features a trifle narrower and the body of the Latin, a little longer and slimmer, as in Fig. 5, gives us the Siren, twentieth century version.

VARIATIONS in form can add up to a dizzy total. To attempt any complete tabulation would be beyond the province of a comparatively short article. Nor is it necessary for the photographer, amateur or professional, to acquaint himself with every possible permutation, even if he had the patience and the leisure for such a task. Instead, the same purpose as can be accomplished by considering the various portions of human anatomy and the broad effects to be expected from variations thereof.

First, the face. Here ordinary familiarity with facial types precludes the necessity for elaborate discussion. We all know the type that seems always gay and laughing, bright-eyed, small regular features.

Opposed to it, is the face of heavy features, still beautiful, but of a sullen cast, as shown in Fig. 1, ideal for the enigmatic expression, smoldering anger, etc. Other faces are friendly, aloof, haughty, humble. Many national types are, rightly or wrongly, associated with certain facial markings, the broad face and high cheekbone of the Slavic peoples, the swarthy oval of the Italian, the stolid Teutonic, the sharp-chiseled outlines of the Norse. There are blond Italians as also dark-eyed and small-featured Swedes, but nobody would believe it, pictorially.

Because humanity looks to the face for revealing signs of character, if this is out of keeping with the general mood of the picture, the total effect is destroyed. At some future time it would be an interesting experiment to compile a gallery of facial types, but for the present we must hasten on.

The hair of a model, its color, texture, length and manner of dress are assuming increasing importance, especially with the advent of natural color processes. Much can be conveyed with

the treatment of the hair alone. For no particular reason that is readily discernable, hair worn at shoulder length is the mark of the exotic or artistic type which, perhaps, is interchangeable. The boyish cut, notably of light wavy hair, is the identifying badge of the Outdoor Girl. Long, dark hair, allowed to hang freely over shoulders and arms is associated with intense womanhood, mystery, allure, as in Fig. 1. Hair color marks the broad division between the Nordic and Latin, as detailed earlier, with the further note that the auburn can be used to suggest tremendous vitality, frankness, this use limited, of course, to color photography.

The length of legs, weight of thighs and



Fig. 6. The Cocktail Girl. This is a variation on the basic Nordic with combined features from the Latin type, such as the cut of the hair, shape of bust and curve of thigh. Note that the arched position of the foot gives the impression of small daintiness.

size of foot contribute greatly to the total effect of a picture. Traditionally, again, the long leg is assumed to be a thoroughly-bred characteristic, indicative of breeding, nobility, dignity. The shorter, sturdy leg, while by no means denoting vulgarity, is more casual and down-to-earth, as in Fig. 3. The long-limbed girl is the aristocrat, her opposite the good companion. Fig. 3 is an excellent example of the dark, short-waisted, short-legged type, best suited for "average girl" shots in which pertness is the thought conveyed.

WEIGHT of thighs gives the impression of youth or maturity. The progressively heavier type characterizes motherhood, the still heavier portraying the drudge. The appearance, or lack of it, of the lower body can make or break the picture. Since individuals are by no means careful to conform to preconceived notions of types, the photographer seeking expression of an idea must pay particular heed to whether or not the lower body conforms to the sum total of impression. Too often a model is selected because her features, hair, shoulder and bust lines conform and it is not until the final print has been made that the evidence of conflicting lower body proportions becomes evident. Unless the picture is specifically planned as a waist-length study, the model must be regarded as a unit, each part of which must adhere rigidly (since this is art rather than life) to the planned pattern.

The arms and hands should, in general, reflect the proportions of legs and feet. The long-legged girl with heavy arms or coarse hands strikes a note of discord fatal to good composition. Hands, their shape and pose, needless to say, are of paramount importance. In all young girl types, whether light or dark, the hands should be shapely and expressive, the fingers long and pointed. A beautiful hand, even in an otherwise satisfactory model, is by no means commonplace. If it is an essential part of the pose, the hands should be carefully examined.

The contour, shape, height and depth of the bust play a subtle yet important role in character portrayal. Generally, the smaller bust associates with the very young

girl or the athletic type, the fuller bosom with the more mature aspects of womanhood. The full, broad bosom, lacking depth is a characteristic of the Nordic types, the deep, pointed and somewhat lower is found in the Latin. Height and general weight of the model is no certain index to bust proportions, over-development being as often encountered in slight models as in those of fuller figure.

Short of emphasized over-development or marked lack of it, the bust line is subject to considerable variation by means of pose. The bosom will always appear flatter and rounder when the model is leaning backward or lying on her back, as in Fig. 5. Conversely, development will seem fuller when the model is leaning forward or is propped on her elbows, Fig. 6. Lighting, too, can seem to change bust line, making it fuller or slighter by means of highlights and shadows.

From the foregoing discussion, it is evident that type may be synthesized to fit any particular set of requirements. As was earlier stated, it is not always possible to secure models who will precisely fit a given set of specifications. Whereas the artist can modify at will, the photographer must bring a very special skill to bear to emphasize virtues and minimize shortcomings in his models. Some brief discussion of these methods is in order.

Based on his knowledge of the basic variations in form, the photographer must seek a model who will as closely as possible approximate his need. Since it is seldom that he will be precisely satisfied, he must next know what types of flaw he can safely tolerate as well as those which make a model totally unsatisfactory. Skin tone, for example, can, within certain limits, be controlled by lighting, negatively. That is, if a dark-skinned model is desired and a fair one is satisfactory in all other respects, skin quality can be modified by means of stains, etc., as well as lighting. On the other hand, an olive skin cannot be made to appear light to any appreciable extent. A bust fuller than might be desired, provided it is of the right shape and height, can be made slighter in the manner earlier
(Page 96, please)

SHOOTING CHILDREN IN ACTION

By Carroll Taylor

Illustrations by J. C. Allen

Children deserve your best efforts in photography. A minicam history of your baby is something that can never be duplicated and whose interest will never fade. Catch children at work and at play, in natural, unposed attitudes. This article tells you how, with complete exposure and posing data.

THE difference between photography and painting has been stated so often, and in so many different ways, that we may be forgiven for adding one more to

the sum total. Painting takes a bit of life and arranges it to suit the fancy of the artist. Photography catches life on the wing and traps it in the act of living.

When you take your youngster and pretty him up, wash his face and back him into a corner to be "mugged" you are not taking a photograph. You are usurping the prerogative of painting. You are arranging life to suit your own preconceived notion, with the chances better than even that the result will be terrible.

On the other hand, if you will use your camera as it was intended, to fix action, to catch the high points of activity as they occur, the result will be such that years later you will have pleasure in the recollection of the event portrayed. The test of a good snapshot is whether it will stand looking at six years after it was taken.

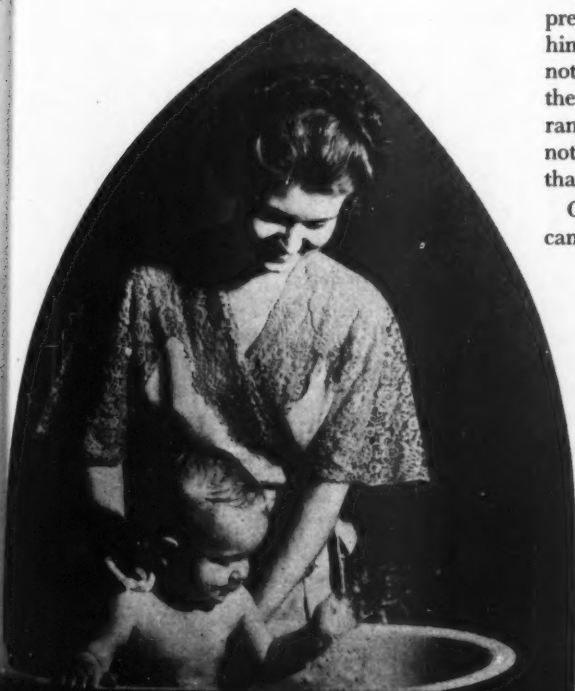


Fig. 1. Baby gets his bath. Taken with two No. 10 Photoflash bulbs, one at the camera and the second five feet to the left and in front of the camera. Exposure 1/200th at f 16 on Panatomic film.

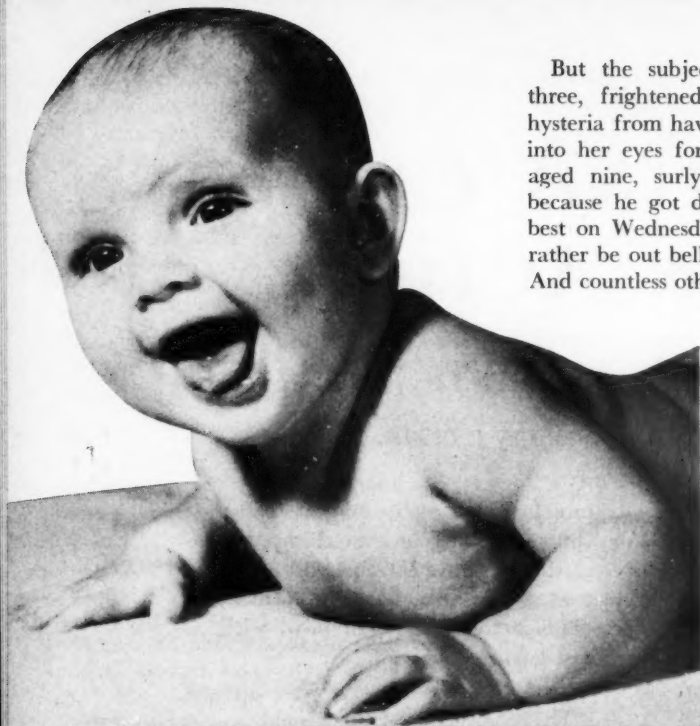


Fig. 2. Bab's first picture. A photographic history of a child can start almost at birth and continue with each stage of the growing child's development. This, and accompanying illustrations for this article, were taken by C. P. Allen of West Lafayette, Ind. and are an unusual progressive series featuring Mrs. Allen and son, Jimmie. Data is two No. 10 flash bulbs in Kalart synchronizer, one at camera and the other four feet to left. Exposure 1/50th at f 16 on Superpan.

In the old days, to be a photographer you had to acquire an approximate "poundage" of knowledge equal to the amount now necessary to run a locomotive. Things aren't that way any more. Compact camera, shutter accurate to a split hair, fast lenses, exposure meters and superior developing and printing technique make it possible for the average amateur to take pictures which, for technical excellence, are every bit as good as the work of the professional. The trick is not how to make a picture, but knowing *what constitutes a picture worth taking*.

The number of pictures of children in varying stages of development snapped during the course of a year if laid end to end would be appalling. And that's about all the bulk of them are fit for—to be mislaid end to end. Not that most of them aren't satisfactory shots so far as light and shade, exposure, etc., are concerned. The oity of it is that they are.

But the subjects! Little Agnes, aged three, frightened into a state of semi-hysteria from having a bright light shined into her eyes for twenty minutes; Willy, aged nine, surly and hating the world because he got dressed up in his Sunday best on Wednesday night when he would rather be out belly-whopping in the snow. And countless other thousands in the same vein.

Yet there is no special trick in recognizing a good picture when you see one. All that is needed is the knowledge and observance of a few elementary rules. First and foremost of these is, "Don't pose your children."

This sounds simple but is perhaps the hardest of the lot. You're an adult and, of necessity, have a thoroughly formulated set of ideas on most subjects. Those ideas extend even to how a

youngster should look when it's acting natural. So you decide to improve nature, touch it up here and fix it there, until, without ever realizing what you have done, you have made your child self-conscious and an inscrutable little Indian with about as much spontaneity as the painted cigar-store variety.

Instead, sit down *without* a camera and watch your child or children at work, at play or going about their appointed tasks. Looking at them this way, you will be amazed at their natural grace, at the succession of perfectly swell possibilities for corking shots they provide. Then, the next time you are picture-taking, get your things quietly arranged, your lights set beforehand, if you need them, and do your snapping as unobtrusively as possible.

KEEP your pictures simple. Don't try to take in too much territory with any one shot. For example, Fig. 6 shows



Fig. 3. The First Step. Two No. 10 Photoflash bulbs, one at camera position, second about six feet to left and in front of camera. Kalart Speed Gun used. Exposure 1/200th at $f/16$ on Panatomic.

Jimmie washing his hands. There is the washstand, a small corner of the wall, the towel in the back ground, and Jimmie himself. The picture is perfect because it tells its story completely and quickly. There is no distracting element present; the picture is a harmonious unit.

There are six ways to clutter a picture for every one for keeping it simple. Here your child's natural spontaneity and the average youngster's concentration on one thing at a time, will help you, if you permit it. Decide in advance, so far as possible, the kind of shot you want. Then get yourself set and wait for it to come around, as in our Fig. 4 where Jimmie decides his supper looks good. When that moment comes, shoot and quit.

Don't crowd your shots. You can't compress a life-time into a single evening and it isn't fair to your children to keep shoving ominous-looking boxes into their

faces every few minutes. If you won't spoil a good thing by overworking it, you will get those simple, yet effective, pictures every time.

Finally, there is the matter of sequence. If one picture of Junior riding his bike is good, fifty of them are not that many times as good. They're like too much ice cream. Your photographic record of your child should really be a progression—a series tracing the high spots of his or her childhood from year to year and from one development stage to another, rather than a pointless reiteration of one or a few cute situations.

Emphasis is gained through selection, not repetition. The photographic record can start almost at birth and then continue, like a serial story. The first smile, the first step, dressing himself, at dinner, and the countless other bits of advancement that in their sum total mark the almost imperceptible stages from infancy to maturity. Your minicam is trapping life at its peak moments.

Don't try to make it read like an alphabet. If the sequence leaves to the imagination the task of filling in the spaces, the record will be that much more moving and poignant.

BECAUSE you will be striving as much as possible for unposed shots, I hope, you will not have too much opportunity to plan elaborate lighting. For that reason, synchronized flashlight work is ideally fitted for the task. (Details of flashlight pictures appear elsewhere in this issue—Ed.). With a synchronized flash unit like the Kalart, your lighting is where you are at any particular moment. Only too often, if you must stop and fuss with lights your picture is gone, sometimes forever.

Another effective method of lighting is Photoflood in combination with flashlight. The advantage of this method is that you

are provided with a general illumination strong enough to give you basic detail, while your flashlight serves to yield highlights and good shadows. Still another advantage of this combined lighting is that you will not get the somewhat harsh contrast that is characteristic of flashlight illumination used alone.

Flashlights in synchronizers may be used in pairs or even higher combinations, but the use of auxiliary Photoflood is still advised. The Photofloods may be put into ordinary floor or table lamps, precaution being taken that the heat of the bulb does not singe or burn the shades.

If flashlight exposure is used, shutter speed and lens aperture will follow the tables for flash exposures. If Photofloods are used in combination with flashlight, lens aperture may safely be reduced one stop beyond those indicated in the tables. The following table indicates proper exposure for one or more Photofloods. It should be borne in mind that Photofloods in shaded lamps will give considerably less illumination than when used with reflectors.

Indoor Exposure Table (Photoflood)

Based on the use of Agfa Superpan or Eastman Super Sensitive Pan Film. Photoflood bulbs in reflectors.

Distance of Light from subject	Aperture	1 Bulb	2 Bulbs	3 Bulbs
4 feet	f4.5	1/10	1/25	1/50
	f6.3	1/5	1/10	1/25
	f11	1/2	1/5	1/10
6 feet	f4.5	1/5	1/10	1/25
	f6.3	1/2	1/5	1/10
	f11	1 sec.	1/2	1/5
10 feet	f4.5	1/2	1/5	1/10
	f6.3	1 sec.	1/2	1/5
	f11	2 sec.	1 sec.	1/2

It is difficult to give more than general guidance on photography with ordinary home lighting since this can vary from dim to very bright. For this work the fastest available film should be used. As a rule, exposures should seldom be less than $\frac{1}{4}$ second at f4.5. Naturally, if faster lenses are available, shorter exposures may be given. A bit of experi-

Fig. 4. What, No Spinach? Two No. 10 Photoflash synchronized with Kalart, one bulb at camera, the other four feet to the left and a little closer to the subject. Exposure 1/25 at f 16 on Superpan.



The Miniature Camera Monthly

mentation will quickly indicate the maximum working limits of your camera.

Don't under-expose. Photoflood and flash bulbs are not expensive. The picture of your children should be clear and sparkling, as bright and full of life as the subjects themselves. These are pictorial records you will cherish all your life and are worthy of your best efforts.

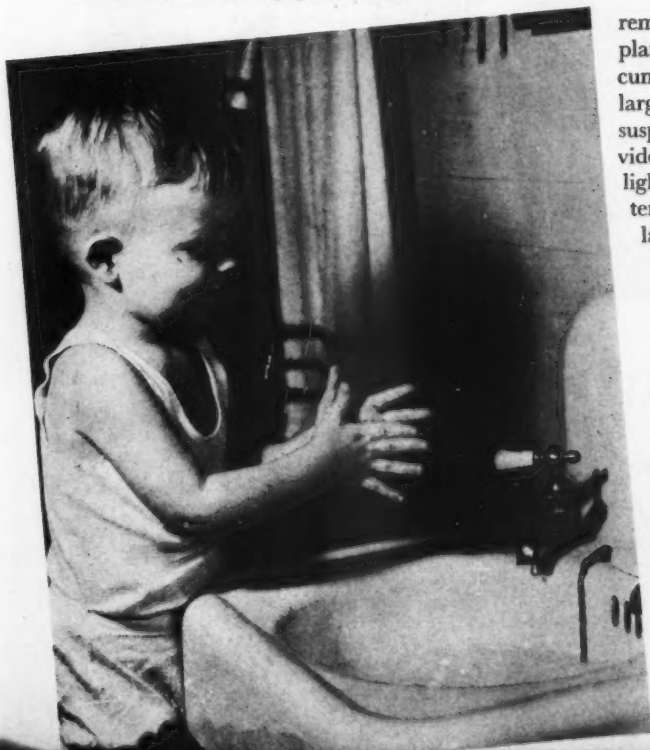
Following are a few hints that will serve to make your pictures that much better and to give them the added touch of quality that frequently makes the difference between just a snapshot and a cherished print.

When you are shooting children at play, it's going to be next to impossible to figure in just what part of the room your best shot will take place. Prearrangement of Photoflood in lamps, therefore, will not be of much help since the best action is like as not to occur at the farthest



Fig. 5. "Now I'll Tell One." Taken with two Superflash bulbs synchronized with Kalart. Exposure 1/100 at *f* 16.

Fig. 6. Washing. Two Superflash bulbs in synchronizer, one at camera, the second four feet to right. Exposure 1/200th at *f* 16 on Panatomic. This picture is an excellent illustration of avoiding complex backgrounds. Note the drop of water clinging to the faucet.



removed spot from your carefully planned lighting. Under such circumstances, I have found that a large size Photoflood in a reflector suspended from the ceiling provides the best possible all-around light. While there will be an intensity spot directly under the lamp, action is seldom likely to occur just there.

With general illumination from one or even two such lamps, it is possible to take an average meter reading of light conditions beforehand and be instantly prepared for your shot in any part of the room.

Don't be in a hurry to shoot. Wait for the ideal combination of pose, background and expression. Give the child a chance to get accustomed to the greater than average brilliance of the room and to forget whatever strange pre-



Fig. 7. Gentleman of Fashion. Two No. 10 flash bulbs, one at camera, the second five feet at left. Exposure 1/300th at f 16 on Superpan.

liminaries of preparation he may have observed. Keep the camera out of sight for a while. That's one of the greatest advantages of the minicam. Slip it into your pocket or put it into the corner of an easy chair while you pretend to settle yourself for a cozy evening with the newspaper.

A newspaper, by the way, is excellent camouflage with a shy or overly-curious child. Select a chair that commands all or as much as possible of the room and prop the paper up on your lap. If the room is not too large, you can generally get everything you want from your single vantage-point without your youthful subject ever being any the wiser. Shooting around the edge of your paper shield is not at all difficult once the youngster decides to ignore you and

concentrate on his play.

The combination of natural light from a window, if it is not too bright, with artificial light, will yield some remarkably effective pictures. The daylight should be used for backlighting only, to pick out highlights in the child's hair and give accents to the head, shoulders and arms. Occasionally, you can get a very beautiful effect from shading the window in such a way that only a thin beam forming a pool of light on the floor is permitted to enter. Don't shoot directly at the beam, but photograph it from one side or another.

For all practical purposes, a faint natural light used with artificial can be ignored when determining exposure. If you must use a strong natural light, you are practically compelled to employ flash-light in conjunction with it, otherwise your foreground will be badly under-exposed.

Fig. 8. Merry Christmas. Taken with Kalart Multiflash and four No. 10 bulbs. The first was at camera position, the second eight feet to the right, in front of the camera. The third was at the left, front, pointing at the lower part of the tree while the fourth was eight feet to the left, placed high and pointing down at the tree. Exposure 1/200 at f 16 on Panatomic film.





CLOUD *Photography*

By Jacob Ritter

CLOUDS are so much a part of our daily lives that we practically never look at them except when a more than usually brilliant sunset lights up the sky or, when squinting at an ominous thunderhead, we wonder whether we can beat the storm home. For the rest we accept the

fluff overhead as just another natural phenomenon.

When we take a camera in hand we are somewhat more cloud-conscious but even here our concern is limited to whether or not a cloud effect can be worked into a picture. We know, generally, that filters of



Fig. 1. Cirrus clouds, tufted form. By F. Ellerman.

varying depth will serve to heighten cloud effects, although few of us could say just how much. And if there are no clouds, well we can always print them in from some other negative so why worry?

Yet cloud photography can be an end in itself, a photographic hobby providing sufficient scope and material for a whole lifetime

of activity. The clouds in the sky might be likened, roughly, to the leaves on the trees. There are certain broad types, but no two are ever precisely alike. If your taste happens to run to the odd and the bizarre you could collect freak clouds, those formations which take shape and outline in the sky, all the way from profiles of faces to complex group studies.

Despite the practically limitless possibilities, both pictorial and educational, in cloud photography, surprisingly little has been written on the subject as guidance for amateur photographers. The author has toiled his way through many a fat and respectable tome in an effort to supplement his own practical observations without achieving much more than a crick in

his neck. This article, therefore, is presented as much in the hope that it will prompt others to add to these observations as to supply a working basis for amateurs interested in this fascinating hobby.

Everybody is familiar with the way a rising cloud of steam will condense as drops of water on mirrors or window panes. It is a characteristic of air heavily laden with moisture to condense its water content if suddenly cooled or brought into contact with a cool surface. The principle behind the formation of clouds is identical. A mass of moisture bearing air traveling along at a considerable altitude will come into contact with a cooler current or a body of rising air will cool by expansion

either effect serving to produce a body of clouds.

The height at which a cloud is formed or to which it may rise or descend apparently determines the general type of its shape. Clouds are therefore classified according to whether they are high, medium or low. Since it

would be far too easy just to let it go at that they are called, respectively, cirro



Fig. 2. Cirro-stratus clouds and fibrous alto-stratus such as originate from thunderstorm tops. By W. S. Davis.

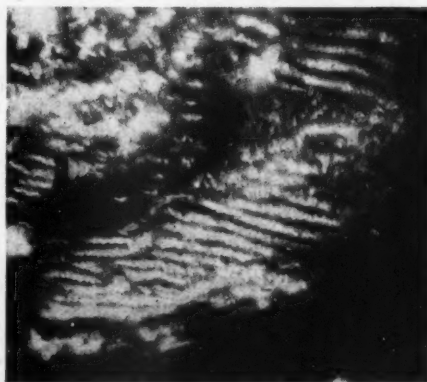


Fig. 3. Cirro-cumulus, viewed directly overhead. By E. E. Barnard.

(high), alto (medium) and cumulo (low). These, as we shall presently see, are further subdivided, again depending on their altitude. In general the cirro or high clouds are found from about 20,000 to 35,000 feet, the alto or middle group from 10,000 to 20,000 feet and the cumulo or lowest from 5,000 to 15,000 feet.

Highest of all the clouds is the Cirrus, shown in Fig. 1. They are delicate detached clouds, quite white and showing a decidedly feathery or tufted appearance. They may appear as isolated tufts, thin filaments on a blue sky and are sometimes arranged in parallel belts which cross a portion of the sky in a circle.

Second of this group is the Cirro-stratus which will sometimes cover the sky giving it a general milky appearance. This sheet frequently produces halos around the sun or moon. It is shown in Fig. 2 combined with the fibrous alto-stratus of the middle group.

Final of the high group is the Cirro-cumulus looking very much like a serrated washboard. It

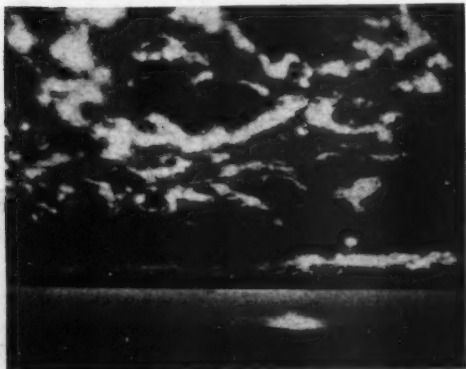


Fig. 6. Strato-cumulus photographed at 5,700 feet. By F. Ellerman.



Fig. 5. Thin alto-stratus forming above a layer of fog. By F. Ellerman.

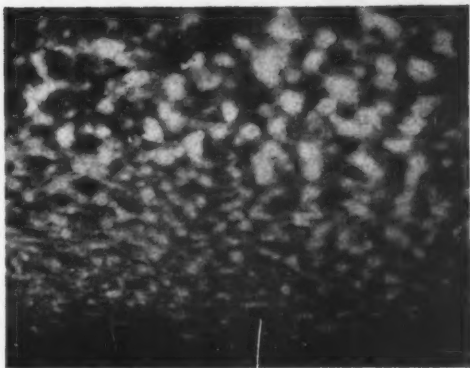


Fig. 4. A typical alto-cumulus formation. By A. J. Weed.

appears as small globular masses or white flakes showing little or no shadows. This is also frequently called the Mackerel Sky because the ridges are supposed to look like the pattern of a mackerel's back. Fig. 3 shows an excellent formation viewed directly overhead.

The alto group contains two divisions. Of these the first is the Alto-stratus evident as a thick gray or bluish sheet of fibrous structure. At times it may be quite thin so that the sun or moon may be seen dimly gleaming through. Just to make things harder it frequently resembles the Cirro-stratus in appearance as well as name, from which it may be distinguished by its grayness or, if it is near the sun or moon by its diffraction colors. It can be seen in Fig. 5 forming above a layer of fog.

Easier to distinguish is the lower of the middle group, the Alto-cumulus, large globular masses, white or gray and partly shaded. They frequently appear in groups so closely packed that their edges appear confused, as in Fig. 4.

By far the greatest variety is found in the lowest forming group, five types being



Outward Bound.

By Ewing Galloway.



Fig. 7. Cumulus formation. By W. M. Lyon.

classified. Of these the first is the Strato-cumulus generally seen as a gray layer irregularly broken up into masses. Sometimes it takes the appearance of great rolls arranged in parallel lines and pressed up against one another. In the center these rolls are of a dark blue color as may be seen in Fig. 6. Blue sky may be seen between the intervening spaces which are of a considerably lighter color.

Prettiest, perhaps, of all the cloud formations is the Cumulus, next in order. They are thick clouds of which the upper surface is dome-shaped and exhibits protuberances while the base is always horizontal. Their appearance changes considerably with the position of the observer. When the cloud is opposite the sun the surfaces facing you will appear more brilliant than the protuberances. When the light falls aslant, as is generally the case, these clouds throw deep shadows. When they are on the same side of you as the



Fig. 9. Nimbus with a layer of fog below. By F. Ellerman.

sun they appear dark with bright edges. Note in Fig. 7 a typical Cumulus formation.

Cumulo-nimbus is the thundercloud. It is a heavy mass of clouds rising in the form of mountains or turrets. It is generally surmounted by a cloud that looks like a cirrus and is called the False Cirrus. Sometimes the upper edges assume the compact form of Cumulus and form massive peaks round which the "false cirrus" floats. From the base of the Cumulo-nimbus fall local showers and sometimes hail. The widespread thundercloud can often be spotted by its formation of a large arc spread over a portion of a uniformly brighter sky. Fig. 8 shows a Cumulo-nimbus just grown from Cumulus.



Fig. 8. Cumulo-nimbus just grown from cumulus. By F. Ellerman.

Nimbus is the rain cloud. It is a thick layer of dark clouds without shape and with ragged edges from which steady rain or snow usually falls. Fig. 9 shows a formation of Nimbus with a layer of fog below.

Final in the group is the Stratus which is a uniform layer of cloud resembling a fog but not resting on the ground. It makes its appearance for the most part only in deep mountain valleys.

THESE, in brief, are the various cloud divisions. Methodically classified they may not seem very exciting but such is not the case. Stray currents of wind will tear off wisps of clouds and blow them about into momentary patterns that are as

changeable as a kaleidoscopic design. A freak wind current can do even such things as the rare shot shown at the head of the article. Looking more like a smoke screen placed by invading airplanes they are clouds nevertheless, their serried appearance due to freak currents over Death Valley, in southeastern California.

If you collect oddities you will find them aplenty in the sky. Fig. 10 is a shot at stormy skies that looks quite ordinary until you take a second glance. Then in the outlined section at the upper right you will see the clearly delineated features of the traditional farmer, complete even to broad brimmed hat and goatee.

An alert eye cocked heavenward and your minicam on hand to record them as you find them are all you need to start such a collection. These are pictures which are fleeting in the most literal sense so you either get them when you find them or never.

Once you have even a bowing acquaintance with the various cloud types it is only a matter of time until you can build up a collection of cloud negatives to meet any possible future need. Since you never know when you are going to encounter the one perfect specimen that you need, your minicam is the ideal camera for this sort of work. Tuck it into your pocket or into a corner of your car and forget about it until the need arises. After that it is only the work of a few moments to bring it out and get your shots.



Fig. 10. Face in the Sky.

By Morris Germain, F. R. P. S.
Exposure 1/100th at $f/4.5$ on Eastman Super X film. A 10-X red filter was used, hence the stormy appearance of the sky. Note the head clearly shown in the outlined area. This is an example of many freak pictures to be found in cloud formations.

Rapid lenses are no particular asset in cloud photography since there is always too much rather than too little light for your pose. Exposures should be fast and taken at small apertures with the lens set at infinity distance. Since the light from the sky is tricky a meter should be used when possible. Much of the beauty of clouds lies in getting the proper exposure, neither too dark nor too light for accurate rendering.

Films and filters, as intimated earlier, will make a great difference. Use of the panchromatic film types is advised since the slower, color blind emulsions will not record cloud effects well unless a supple-

(Page 98, please)

GUNNING

With Your Minicam

By Harry Harris



Fig. 1. Peacock in full glory.

Black Star.

THERE isn't any closed season on gunning with your minicam. Your activity need not be confined to a few mad weeks in the year during which time your fellow huntsmen in the woods will be trying to put on an imitation Chateau Thierry, with the chances about even of potting you or a grouse.

Gunning with your minicam is finer sport than any you have ever had with a rifle. Pick your own time of year, spring, summer, fall, even winter. Do you want the companionship of your dog? By all means take him along. He will be excellent for flushing birds and nosing out nests

that might otherwise escape your eye.

The sport of hunting yields two forms of satisfaction. First, it takes you out into the open, into the sun, under the trees and gives the cigarette smoke a chance to seep out of your lungs. After that is the tingling thrill of bringing down your quarry, the tangible evidence of your prowess in the form of broken-necked bird dangling from your belt.

Minicam hunting will give you the same pleasures and a lot of others in addition. No legislature sitting in solemn conclave will ordain when you can and when you can't head for the open spaces. And you



Fig. 2. Take-off. By Dr. Paul Wolff. A remarkable action photo caught by one of the world's outstanding minicam photographers. Note the tremendously powerful wings that enable the bird to cross long stretches of empty ocean. Taken with a Leica, 1/200 h a: f 3.5, late afternoon. An orange filter was used to darken the sky. Black Star.

can have your proof of prowess, too, in the form of pictures whose taking represents singular skill. Your rifle will be your minicam and if you don't think you need to be a marksman you have some surprises in store for you.

You will have to match your wits against those of the birds you are after. Naturally you want to work closer with your camera than with a gun, even if your job is equipped with a long focus telephoto. That

means studying and learning something about the habits of your game, acquiring the knack of creeping up on it without spreading the alarm, jockeying yourself around to a position where pose and light are favorable for a shot. Anyplace you can hit it is a rule good enough with buckshot, but it doesn't go with lens and film.

Patience will give you results in the form of superb pictures that will rock the average amateur Daniel Boone back on his heels. Take a shot such as Fig. 4, "Wild Geese in Flight", enlarge it to 22x26, wall panel size and then set it alongside the dusty stuffed goose hanging on your friend's wall. That generally ends any argument.

The minicam is ideally suited to bird photography. First, weight is down to a minimum. That's important because even a couple of pounds can make a tremendous difference when you are on an all-day tramp. Too, when you start stalking in earnest you certainly don't want your motions hampered by a big clumsy box that will bang against trees, tangle up with branches and generally herald your approach as thoroughly as though you were preceded by a fife and drum corps.

No, what you need is a small camera, one that you can shove into your pocket or strap around your neck. By the same token, accessories should be pared down to



Fig. 3. Noddy On Her Nest. By Hugo H. Schroder. Taken at Garden Key, Dry Tortugas, Fla. The nest was built on a wooden tie of a track on the docks of a coaling station. The lining of the nest consists of pieces of shells and chips of rusty iron! Taken with a Rolleiflex, exposure 1/50th at f 16 on Agfa Plenachrome.

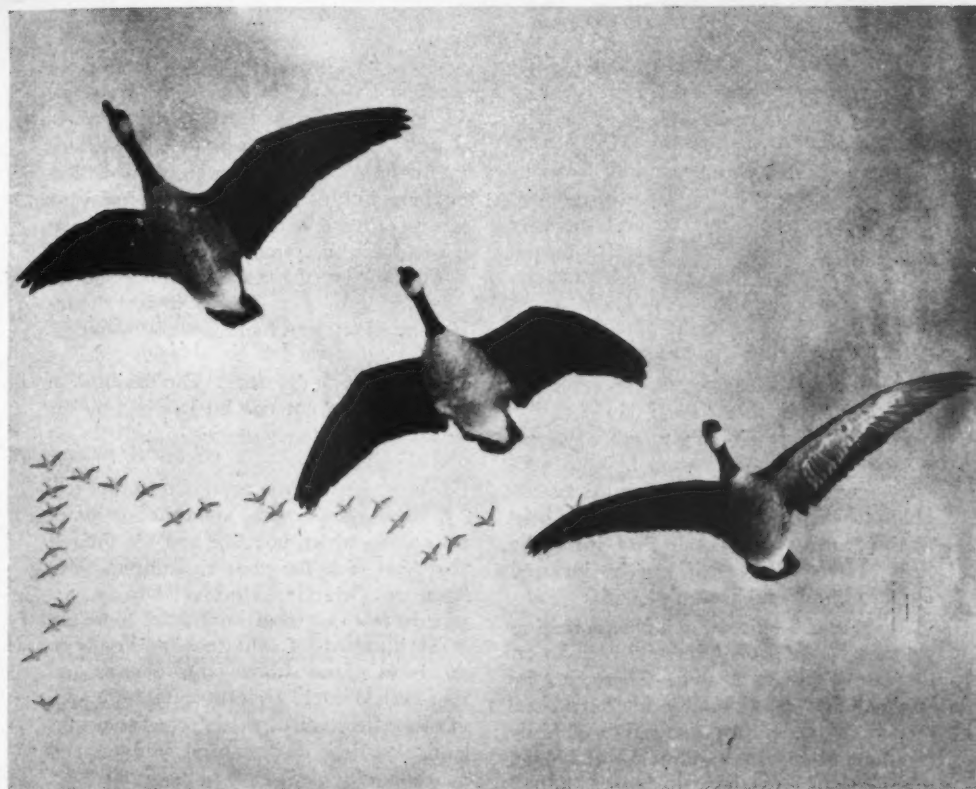


Fig. 4. Wild Geese in Flight.

Ewing Galloway.

Harbingers of spring and of winter. They fly to the subtropics in winter and to the Great Lakes region and farther in spring affording a chance at superb photography over a wide region of the country. Exposure 1/100th at f 12.5 on Eastman Panatomic film.

an absolute minimum and then, of these "indispensables", no more carried along than can be tucked into your pockets. Your short focus lens, the one that comes with the camera, is going to be used for the vast majority of your shots. If you own a supplementary telephoto, not so big that it absolutely requires a tripod, by all means take it along. The rare shot on which it will come in handy will be so good, chances are, that you will be repaid for having toted it. If you own an exposure meter by all means take it.

A visible view finder for waist level shooting, if your camera is not already equipped with it, or a wire frame finder will help you get those quick-fire shots that are now or never. A tripod comes in handy for some types of picture, notably nests, etc., where long exposure in shaded spots is necessary. Select one of the folding vari-

eties that can be tucked away into a back pocket. A lens shade and perhaps a yellow and green filter plus plenty of extra film complete your equipment.

Don't make the mistake of starting out on a day's trip without twice as much film as you think you'll need. You are going to encounter prize shots that you will want to snap from every angle and over a variety of exposure. The film you don't use on this trip you can always bring back, but the shots you missed because your camera was empty are the ones you'll bemoan the longest.

YOUR work will by no means be limited to woods and field. Some of the most breathless of all bird pictures can be made of the soaring sea gull. Dr. Paul Wolff's remarkable shot shows the bird beating its wings above the waterfront

housetops, Fig. 2. The blur of the wing tips serves to emphasize the sense of rapid motion. Notice in Fig. 5, "Soaring", by De Mauro, the remarkable wing spread that enables these tireless birds to make non-stop journeys of hundreds of miles.

In the marshes you will find the wild goose and his kin. Their graceful formation as they wing their way from subtropics to the northern lakes has been caught in Fig. 4.

The 6x6 twin lens reflex, such as the Rolleiflex, is ideally suited for picturing the smaller birds in their native habitat. Frequently it is difficult to get a worthwhile shot with the camera held in an ordinary way. The twin lens reflex fits admirably into these emergencies. It can be held at right angles for a better view, it may be held at eye level, or it can be inverted overhead and held at arm's length.

Last June, I visited the immense nesting colonies of the soots terns and noddies on the Dry Tortugas Islands. These tiny islands at the very tip of Florida have been the homes of countless thousands of birds for more than one hundred years. With my minicam I obtained a series of shots I consider unique of their sort.

Noddies usually nest in the low bushes

where a nest lined with bits of shells is the receptacle for their lone egg. However, the birds are not the least bit choosy about a nest site. I have seen nests placed on low clumps of grasses, even, on occasion, on bare bits of reef coral. My minicam has recorded a noddy covering her egg at a nest built on a wooden tie at the side of a track in an abandoned coaling station. Another bird, Fig. 3, was caught beside her egg in an even more unusual situation. She had deposited it on a fallen piece of ironwork on an old dock. The hardness of the metal was not one bit lessened by the nest lining of slivers of rusty iron!

THE pictures you are going to get will depend, of course, upon the section of country in which you live and the time of year you pick for your expeditions. My home is Orlando, Florida. During the months from October until April there are many hundreds of wild ducks and gulls on the lakes of my home city. Scaups and ring-necked ducks are protected there and, shortly after their arrival from the north-land, they lose their natural wildness and may be observed and photographed at close range. Likewise, hundreds of wild ring-billed gulls appear on these lakes in winter and become so tame that they will snatch bread held out to them.

One of the great advantages of the minicam in nature photography, and which to my way of thinking has not been sufficiently stressed, is the relatively wide angle of view to be had from the short focus lenses with which they are equipped. On many a field trip, in the old days when I was carrying a large camera equipped with an eight inch lens, I have encountered difficulties due to cramped quarters where the long focus lens, far from helping, was a decided disadvantage.

A single instance, typical of

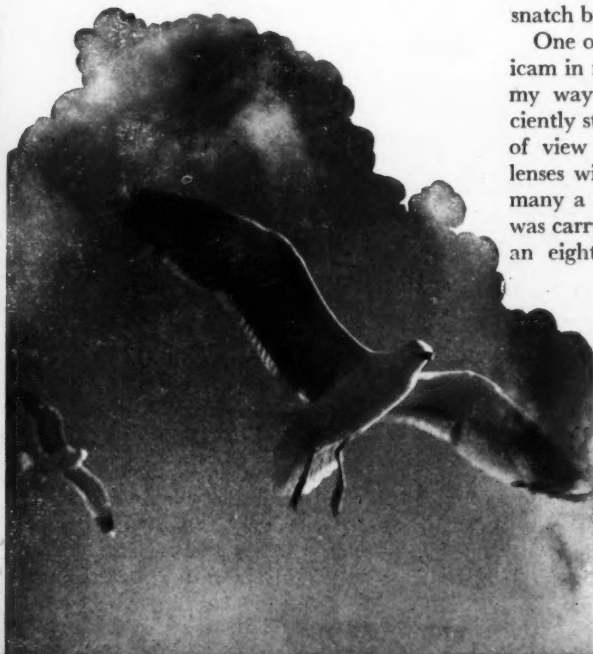


Fig. 5. Soaring. By De Mauro. A magnificent shot of the sea gull's wing spread. Compare this picture with Dr. Wolf's action shot in Fig. 2. Despite slower shutter speed this picture shows less motion due to the bird's slow circling. Cameras equipped with lenses of $f/6.3$ or even slower can get shots such as this if you select the right moment at which to shoot. Exposure $1/50th$ at $f/8$.

many, will prove my point. One of the most interesting of all Florida's birds is Audubon's caracara. Caracaras, in Florida, place practically all their nests among the leaf stalks of cabbage palmettoes, frequently fifteen to fifty feet from the ground. This makes it impossible to stand up beside a caracara's nest, to say nothing of trying to use a

Fig. 7. Blue Jay.

By Hugo H. Schroder.

The bird had been stunned and was taking time out to recover on this lady's finger. A moment after this picture was taken it recovered sufficiently to beat a hasty departure. Taken at Orlando, Fla., with a Rolleiflex. Exposure 1/100th at f11 on Eastman Verichrome.

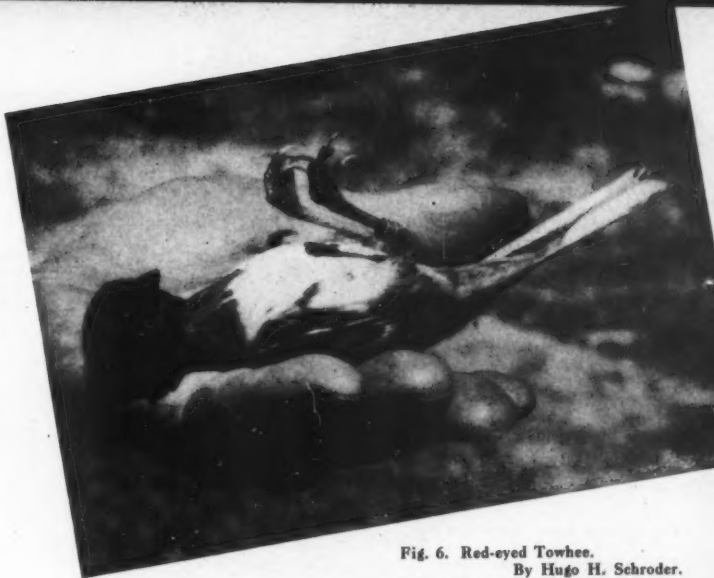


Fig. 6. Red-eyed Towhee.

By Hugo H. Schroder.

When birds are placed on their backs they usually remain quiet for a while before realizing that they are free to depart. Taken at Winter Park, Fla. Taken with a 6 x 6 Rolleiflex. Proxar lens used. Exposure 1/25th at f16 on Eastman Verichrome.

long focus lens.

Once in a great while I have found such a nest in an oak, but so far I have seen only two which were not in palmettoes. The first one I found in an oak was in the smaller branches at the top where I could barely get a foothold beside the nest. When I stood up to photograph the two big brown-spotted eggs, all my big camera showed was a portion of the large nest, a few inches on either side of the speckled beauties.

I am offering the resulting photo, Fig. 10, as evidence here. When a bird's nest is photographed, one should always try to show the entire structure as well as the eggs. In fact, it is advisable to get several shots, one showing the complete nest and others to include some of the surroundings. My shot of the caracara eggs leaves everything to the imagination. It does not show the entire nest, neither does it show any of the surroundings. The photo might even lead one to believe that

MINICAM

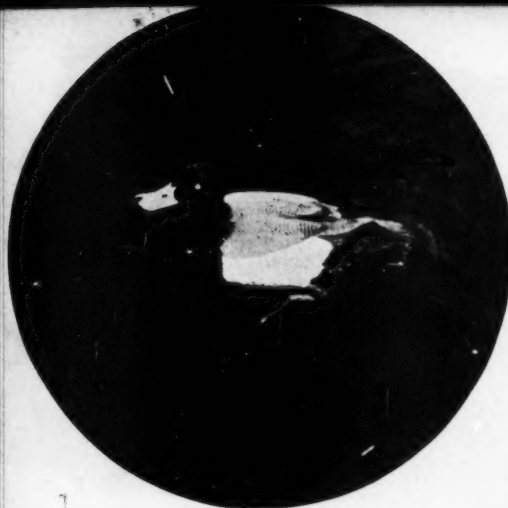


Fig. 8. Male Scamp Enjoying a Dip.

By Hugo H. Schroder.

This excellent shot clearly shows the color pattern and other markings on the duck. Shots such as this are easily within the power of inexpensive hand cameras. Taken with a Rolleiflex, exposure 1/30th at f7 on Eastman Verichrome.

the nest had been removed from the tree and that is the one sin bird photographers should never commit. All nests should be taken where they are found.

If I had known then what I know now this shot would have been very different. A two inch lens with its wide angle of view would have had no difficulty getting the entire nest into the picture despite the cramped nature of the working quarters. Needless to say, as soon as I realized how much I had been missing, the big camera went up on the shelf and stayed there.

A PROBLEM of an altogether different sort was shooting the sooty tern shown in Fig. 9. These birds place their single egg on the bare sand or on a mixture of ground-up shells,

Fig. 9. Sooty Tern Covering Single Egg. By Hugo H. Schroder.

The bird raised up off the ground enough to reveal the way her breast feathers entirely surround the egg which touches the brood spot on her breast. Taken with a Rolleiflex, 1/25th at f11. Overcast sky. Eastman Verichrome film.

coral and sand which constitutes the ground of these southern islands. On Garden Key it was possible to look down on more than 30,000 nesting birds, a never-to-be-forgotten sight. This shot of the incubating sooty tern is one of the most interesting photos of bird life I have ever secured. The bird had risen from the ground so as to reveal the feather covering around the single egg as it is in contact with the bird's body. In the photo this looks like a big tumor on the bird's breast! Here my job was to get the picture quite close up and at a speed that would not disturb the bird unduly. The minicam accomplished its job in short order.

The minicam fan who keeps his wits about him will fit rare shots in odd places. Early this year I saw a girl with a blue jay on her finger. Someone had found this bird in a dazed condition and had turned it over to the young lady just a few minutes before I came by. My minicam was handy and I took two shots of the jay, one of which is shown in Fig. 7. Hardly had I finished with my second exposure when the jay had fully recovered and took wing again, but not before I had had an opportunity to record his brief visit.

On a par with the above is a shot I secured as the result of a visit to a friend interested in bird banding, Fig. 6. The shot illustrates the method sometimes used to hold the feathered captive after the



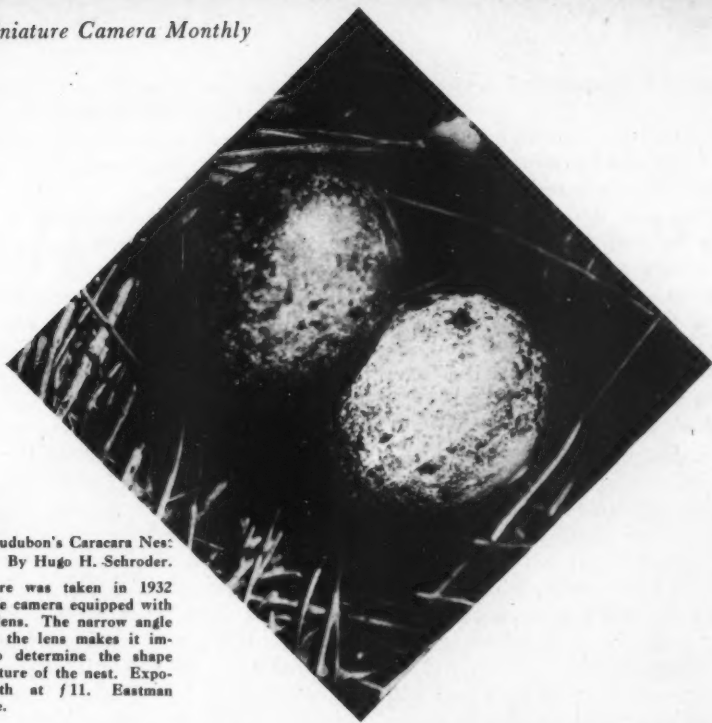


Fig. 10. Audubon's Caracara Nest with Eggs. By Hugo H. Schroder.

This picture was taken in 1932 with a large camera equipped with an 8-inch lens. The narrow angle of view of the lens makes it impossible to determine the shape or even nature of the nest. Exposure 1/25th at f11. Eastman Verichrome.

band has been applied. Lying on its back, without any restraint from its captor, the Towhee remained quietly in this position for a while before realizing that it was free to return again to the wild.

THE results you will get in bird photography depend largely upon what you want from it. If your interest lies in the direction of the picturesque, such as Dr. Wolff's magnificent gull or the equally brilliant "Wild Geese in Flight", luck will naturally play a great part. On the other hand, if you are a noser-out of nests and have a taste for picturing these shy creatures going about their every day lives in their natural habitat, your prime requisite must be patience.

Certainly, you do not need elaborate or costly equipment in either case. As mentioned earlier, you rarely have the working space or opportunity in point of time to get set for telephoto shots, although the few you can get are assuredly worth having. In the main, however, a lens working at $f6.3$ or faster and shutter speeds of $1/100$ th of a second or faster will take care of the bulk of your situations.

Birds in flight move at unbelievably great speeds, particularly the game birds on their treks of a thousand miles or more across the continent from north to south and back again. The ability to make successful photographs of rapidly moving objects depends as much on the distance and direction of movement, with relation to camera position, as it does on actual miles per hour of speed. Birds in flight are generally at a considerable height. In addition, it is seldom difficult to pick a camera position such that the line of flight will be diagonal to the lens or receding from it, rather than across its line of vision. Under such circumstances, excellent pictures have been made in good light at apertures of $f8$ or smaller and shutter speeds as low as $1/50$ th. Some sense of motion will be evident, of course, but this is more of an advantage than otherwise.

The best shots of flying birds, as a rule, are those which show them soaring or circling for a descent. The wing spread and even the markings of body and wing will be plainly discernible. The speed of flight will be cut down considerably so that even a light filter for a good cloud background

can be used with comparatively slow shutter speeds.

In the woods your problem is somewhat different. Light will be diffused and weak to the point where you will frequently be compelled to take slow exposures. You will rarely encounter a situation where there will not be a fallen tree trunk or a branch against which to prop your camera for bulb or time exposures. The pocket tripod comes in handy here, if you are lucky enough to own one. Its lack may make a few shots more difficult but by no means impossible.

Choice of film will make a great difference in your results. Your first thought will be to use the fastest possible emulsion in order to compensate for lens slowness or the poor quality of light you expect to encounter. This is a mistake, I have found. The faster films tend to give poor contrast and yield a grain size that makes any considerable enlargement impractical. In bird photography you want pictures that will show a wealth of detail, the fine markings of the birds, the structure of their nests, etc.

Some sacrifice in film speed for the sake of a negative that will stand enlargement is in order. There is another point to bear in mind here. Despite your best efforts and all the cunning at your command, a great many of your shots will be taken at a considerable distance from your quarry. This implies the need for a degree of enlargement considerably greater than any you will want under more normal circumstances. Enlargements of ten and fifteen diameters to blow up what, on your negative, was only a tiny speck against a vast expanse of sky or a welter of tangled foliage, are by no means uncommon. For that you need a film whose inherent structure is such that the enlargement will approximate your original subject rather than a cobblestone curb.

You can't get every shot, so you might as well reconcile yourself to that realization from the outset. Your slow speed film will cut down the total number of pictures you can capture but it will insure excellent results from ones you do get. Just because you are working with birds, fast on the take-off and quick to take alarm, does not

mean that you must of necessity work at wide apertures and high shutter speeds. Birds light and linger as often as do their human cousins. You need plenty of exposure to register fine markings and for shadow detail, so take your time.

Don't potshot at birds zipping by your nose at seventy miles an hour. Even if you are fast enough to catch them, like as not the resulting film will show only a blur. Learn to stalk. Birds are curious tykes. They may take momentary panic at the branch crackling under your heel, but if you stay quiet and make no further noise, most of the time they will not be able to resist the temptation of coming back for another look. You see, there is not so much difference between you and your game as you might think offhand.

Don't hang around a nest too long and don't pull them apart for the sake of a picture. If the one you have found is so concealed as to make it impossible to shoot, leave it be. There is bound to be another a little way along better situated. A good rule to observe is to live and let live. You will be surprised to discover how soon the tiny creatures will realize you mean them no harm, provided you don't go crashing on your way. And at the end of the day you will have to show for your efforts not a smear of bloodied feathers but a record pulsing with the life you have found, photographed and left in peace.

Contest News

The MINICAM prize picture contest announced in our September and October issues closed October 20th. \$175 in prizes are offered and will be awarded by the middle of November. Prize winners will be announced in the next issue.

Watch MINICAM regularly for news of prize picture contests for our readers. The next contest will be announced soon.

Offices Moved

The offices of MINICAM in New York City have been moved to our home office at 22 East 12th Street, Cincinnati, Ohio. Editorial, advertising, and circulation offices are there. Western advertising office remains at Suite 528, 333 North Michigan Avenue, Chicago.

What FILTER?

By E. M. Ludlam

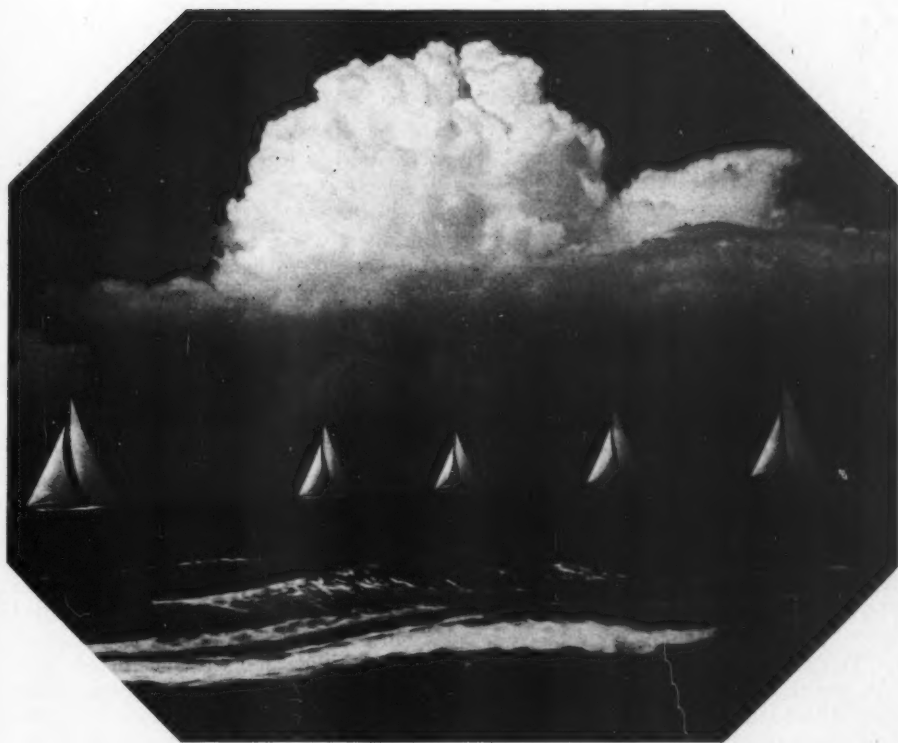


Fig. 1. HOMEWARD BOUND

BY JAMES H. BELL

Taken with a Leica 35 mm. Wide Angle Lens. The picture was made from two negatives combined. The boats were shot at 1/100th at f 11 with an A filter for strong contrast. The cloud effect was from another negative taken at 1/200th at f 8 with a K-4 filter. Eastman Panatomic film used on both shots.

Br-r-r-r-r-ing—B-r-r-r-r-ing!
"Hello."

"Ralph calling. Say, are you free this evening? Bill and I tried some filters on a bunch of shots last week and some of them look worse than those without filters."

So half an hour later the boys barged in

with their troubles. Bill explained a little further; they had read an article on filters and the illustrations looked so classy, that they decided to try it. Taking one shot each time with the filter, and then one without, they had become twisted afterward because the negatives in several cases,

which they were sure had been taken with a filter, printed worse than the ones taken without. Several books in the library had kept them busy the rest of the week. Each had read different material and this afternoon they began to compare notes. Somehow, they couldn't agree and seemed to get more involved the more they tried to reconcile the results of their reading with their pictures. Therefore the visit.

"Well, Bill, supposing you run down and dig out my folder on filters while I look over these prints and negatives."

The boys have learned to keep records of exposures, etc., which made it easy to check back. Only one fault stood out and I put it to Ralph with a question.

"Why did you use a red filter on this shot of Ruth, Ralph?"

"Well, she had on a red and blue striped bathing suit and we wanted the red stripe to show up."

Bill, arriving at that moment, added, "If you wanted more snap, wouldn't you use a red filter? We figured that if we wanted the red and blue stripes to show up, that was what we had to do. The trouble is, it didn't work."

"No, boys, it couldn't do what you expected it to. You see, you didn't quite get the idea of how the filter works."

"Well," Ralph chimed in, "if you use a deep yellow filter it reproduces things just as they are; while if you use a red filter, it makes the reds in the picture come out lighter and you get more contrast."

"You're both right and wrong, Ralph. You see, all films are more sensitive to blue light than to any other color. That's why blue skies come out perfectly white, except with the superspeed films where the extra sensitiveness to blue light has been compensated by increased sensitiveness to red and green light. What your yellow filter does is merely to shut out some of the blue light so that the green and red will be more effective on the film. In this way, we hold back the blue sky tone and give the red and green light coming from white clouds a chance to affect the film. In the print, the sky will be a gray tone and the white clouds will stand out.

"Do I make myself clear, boys? *The*

purpose of any filter is to hold back from the film either part or all of the light of certain colors. Thus, a yellow filter will let green and red light pass through but will hold back some of the blue. The deeper the yellow color of the filter, the less blue light it will let through."

"But yellow is made up of green and red, according to the book I read, so how does *any* blue get through?"

"Dark yellow is made up of green and red, but light yellow is really dark yellow mixed with white. The blue part of the white light can pass through the yellow filter."

"Then that explains how a green filter can be used without cutting out all the blue and red light entirely. I was wondering about that, too."

"That's right. Of course, we sometimes use filters whose color is dark enough to cut out all the light except that of the filter color itself. That was what Bill got twisted on when he called the red filter a contrast filter. You, for instance, used a light red filter when you took Ruth's picture. Her suit was striped blue and red.

"The picture you took without a filter shows the blue stripes quite light and the red stripes as dark gray, and it looks very natural. The red filter, however, made the blue come out as a gray because it held back most of the blue light. At the same time it forced you to give a longer exposure and, as a result, the red light had a longer time to act on the film; for, remember, that just as much red light reaches the film through a red filter as does with no filter. That is why the red came out as a medium gray and you can hardly see any stripes in the print at all, since both the red and blue came out almost the same tone."

"Well, then, when would you use a red filter in ordinary work?"

"You remember seeing the red cannas by the driveway? Supposing you had to take a picture of them—what would you do?"

Ralph: "Use a K-3 filter to get correct color rendering."

Billy: "I begin to see. If you use a K-3 filter the red flower and the green leaves

AM

rom
t of
will
but
The
the

and
how

and
allow
the
allow

filter
the
der-

imes

h to

the

got

er a

ed a

pic-

red.

filter

the

very

made

se it

the

nger

had

, re-

light

does

ame

ardly

since

t the

red

nnas

d to

you

rrrect

K-3

eaves



Fig. 2. LATE EVENING BY E. M. LUDLAM
Taken through a G (Orange) filter whose purpose was to strengthen the sky and deepen the shadow in the foreground. Exposure 1/100th at f/3.5 on Defender Superior Pan.

Fig. 3. SUMMER TWILIGHT BY E. M. LUDLAM
The light red filter used to take this shot gives an unusual moonlight effect. Exposure 1/10th at f/8 on Eastman S. S. Pan. A deep print was made by enlargement to heighten the "night" effect.



will look as if they were the same color. Then, by using a light red filter, the flower can be made to look brighter than the leaves and it will dominate the picture."

"Exactly! But remember that a dark red filter will make the flower very light and looking at the print, one would get the impression that it was supposed to be yellow."

"Then what does everybody mean when they talk about correct color rendering?" demanded Ralph.

"Really correct color rendering means that all colors will reproduce as shades of gray corresponding directly to the intensity of the color as it appears to the eye. That is to say, if the three primary colors, red, blue and green, appear in the subject to be pictured, they will reproduce as the same shades of gray."

"You mean, then, that if those colors were used for the stripes of a flag or an awning, you couldn't tell one from another."

Exactly! Not only does true color rendering make it impossible to distinguish one stripe from another in a case like that, but it can spoil many another picture. For instance, with the cannas. Often you face that problem of flowers whose color is as deep in shade as the green of the leaves. A K-3 filter, which gives correct color values, will give a flower of the same tone as the leaves. Such a result is far from pleasing and appears very unnatural. A filter must be chosen which will either render the flower darker than the leaves or lighter, according to the effect desired. The interest can then be centered on the flower where it belongs and the monotony of tone is relieved. To lighten the flower, use a filter of the same color. If it is desired to have the leaves lighter than the flower, use a green filter. A light filter will make a small change, a darker filter a greater change. Often it will be found that the best result will require no filter at all. Always consider this possibility: *We spoil more shots with the wrong filter than by neglecting to use one.*"

"Would you advise Ralph and me to take shots both with and without the filter, at least for the time being?"

"Not only temporarily, but always, because it's often difficult to picture in your mind just how much the filter will change the tone value. Very often where you consider a light filter necessary, it really changes the tone too much and a picture without a filter proves better. It works the other way, too. Sometimes a filter really is necessary when it looks to the eye as if we could get by without one, so whenever much color is present in the subject, try pictures both with the filters which seem most advisable, and without any. And keep a record for future study.

"Let's try and fix this thing in our minds a little more firmly. Without any filter, blue, such as a blue sky, reproduces much lighter in the print than it appears to the eye in the subject. Thus, if clouds are present in a blue sky, the blue will appear so light in the print, that the clouds will hardly show at all. Green reproduces quite normal without a filter, but red generally is a little too dark.

"Yellow is a combination of red and green, so a yellow filter will pass red and green light and exclude the blue. However, as we mentioned before, a light-colored filter also passes white light, and this, being made up of all colors, includes some blue. Consequently, by using a light yellow filter, we can hold back some of the blue and let all of the red and green light through. In this way, we can cause the blues to print slightly darker without materially affecting the other colors. The darker yellow filters are also good for cutting out the haze which obscures the distant views in landscapes. This haze is a diffused blue light caused by dust and mist in the air and the yellow filter, of course, weakens its effect on the film.

"The green filters affect blue about the same as the yellow ones, but they lighten the green foliage, etc. They also have a tendency to darken reds and it is because of this that they are generally recommended only for films which are particularly sensitive to red light. They are wonderfully helpful in landscape work, especially when the green foliage of shrubbery or trees dominates the picture. Without the filter, the effect is of very large dark

masses. The filter lightens the tone and brings out more detail, making the large masses so much more interesting."

Ralph: "Speaking of green filters, I noticed in a set of tables I was looking at the other day, that for the Wratten filters they give exposure factors for daylight for the X-1 Green filter and for the X-2 Green they give a factor only for Mazda light. Aren't you supposed to use either filter both for daylight and artificial light?"

"The Wratten green filters were originally designed to be used with Eastman Super Sensitive Panchromatic Films, the X-1 giving correct color value in daylight and the X-2 being slightly darker to give better color rendering in Mazda light. There's no reason, though, why you couldn't use an X-2 filter outdoors for any special effect you want to obtain.

"Billy's light red filter and also the orange filters are great for getting dramatic cloud effects. They cut so much of the blue light that clouds stand out in the print against dramatic dark skies. They also cut out green light; so remember that grass and trees are going to print quite dark and the general effect is apt to look stormy unless the whole scene happens to be flooded in sunlight when the picture is taken. Of course, as we mentioned before, when talking about the pictures of the cannas, the red filters and also the orange ones lighten red objects. That's one thing we have to remember when planning to use a filter. If we want to make one

color appear lighter or darker, the filter will also affect other colors. We can't simply pick out a filter and say, 'Now this will make my blue sky very dark.' We must remember that the other colors too will be affected."

"If the filter is holding back light of the color we wish to appear darker in the picture, I can't see why we have to increase the exposure so much," said Ralph. "In fact, if it passes all the light of the colors we want, then I should expect the exposure to remain the same."

"That looks like good logic, Ralph, but it doesn't work. You can see that from your own negatives. They all look to be much the same as far as exposure goes, but you gave the light red filter shot forty-five times the exposure without the filter. The point we miss there is the more technical side of reflections. Actually, a green leaf



Skyscraper—
By Kenneth Houston.

Taken on a July afternoon in brilliant sunshine. A K-2 filter was used to hold back the sky and permit the clouds to register on the film. Exposure was 1/300th at f 8. The camera position was Bryant Park in New York, the shot being made through the leaves of the tree at the right.

FILTER	EXPOSURE FACTORS				EFFECT	USE
	ORTHO FILMS		PAN FILMS			
	SUN	MAZDA	SUN	MAZDA		
Light Yellow						
AGFA No. 1.....	1.5	1.0	1.5	1.0	Causes BLUE objects to print slightly darker than without a filter.	To bring out clouds. To preserve detail in blue clothing.
LEITZ No. 1.....	3.0	2.0	1.5	1.5		
WRATTEN K1..	2.0	2.0	1.5	1.5		
ZEISS Light.....	2.0	1.5	1.5	1.0		
Medium Yellow						
AGFA No. 2.....	3.0	2.0	2.0	1.5	BLUE prints slightly darker than with the light yellow filter.	Good cloud rendering. Good detail in blue clothing and flowers.
LEITZ No. 2.....	6.0	2.5	2.0	1.5		
WRATTEN K1½	4.0	3.0	1.5	1.5		
ZEISS Medium....	3.0	2.5	2.0	1.5		
Dark Yellow						
AGFA No. 4.....	5.0	3.0	2.5	2.0	All colors print in the correct technical values.	Strong cloud rendering. Haze and mist cutting.
LEITZ No. 3.....	8.0	3.0	2.0	1.5		
WRATTEN K2..	5.0	3.0	2.0	1.5		
ZEISS Dark.....	4.0	3.5	2.5	2.0		
Green						
WRATTEN X1..	7.0	.....	4.0	.....	Similar to medium and dark yellow filters except that GREEN and RED print lighter.	Landscapes, particularly where it is desired to brighten greens.
WRATTEN X2..	10.0	.....	.....	5.0		
Orange						
WRATTEN G....	7.0	6.0	2.5	2.0	BLUE objects print darker than they appear to the eye. Other colors print lighter.	Unusual clouds. Haze cutting. Snow scenes.
ZEISS Orange....	10.0	6.0	3.0	2.5		
Light Red						
WRATTEN A....	.....	.....	4.5	3.0	BLUE objects print quite dark, RED quite light and GREEN slightly dark.	To distort the color values to obtain good separation.
LEITZ Red No. 1	.....	.....	7.0	3.0		
Dark Red						
WRATTEN F....	.....	.....	10.0	5.0	BLUE objects print very dark, RED very light and GREEN quite dark.	Dramatic effects. Moonlight effects. Copying Blue Prints.
LEITZ Red No. 2	.....	.....	40.0	20.0		

does reflect a lot of blue light, as does any object that has a shiny surface. You can take almost any subject and make a picture of it with color-blind film, such as was used in the early days of photography. So, if you are photographing a red hat, the light which reaches the film from the hat will contain a certain proportion of blue and green although it appears to be a pure red. If, by means of a filter, we cut out this light, allowing only the red to pass, then we must increase the exposure to compensate for the loss. It is peculiar, but nonetheless true, that green leaves seldom reflect as much as 50% of green light to the camera, the remaining 50% or more being a mixture of red and blue.

"The film also affects the amount of ad-

ditional exposure required. Fast Pan films, as used today, are much more sensitive to green and red than ever before. They are, however, still from two to six times as sensitive to blue light as to either green or red. So, if we are cutting out an appreciable proportion of the light and, as is often the case, the blue to which the film is most sensitive, we must, of necessity, increase the time of exposure to compensate for this loss."

"I can see that now, all right," said Ralph, "but why do they give different multiplying factors for indoors and outdoors?"

"Well, first of all, that indoor business really means artificial light. You see, an object can only reflect such light to the

camera as may reach it from surrounding sources. Each source of light has its own color makeup: thus, daylight is somewhat strong in blue, and ordinary electric lights are very weak in blue. Obviously, the effective speed of any film will be lessened if used in artificial light since it depends so much on the blue for its speed. In fact, working in artificial light is practically the same as working in daylight with the same film and a medium yellow filter.

"I tell you what you do. Take my typewriter and copy off this table. It not only gives you the proper factor to correct the exposure for most filters, but shows when to use them and approximately what they will do."

Half an hour later, the boys were leaving and Billy tried to put it into words. "Thanks, Lud. My head feels awfully full, but with that table to help, I feel a lot

more confident about using a filter next time."

★ ★ ★ ★

IN MINICAM for October, Terry Wagner told how specialization in one particular phase of photography pays well. Directed effort gives your camera enjoyment a solid base. MINICAM pays \$10.00 for each picture published from its readers who specialize in any one phase of minicam work. MacNeill Davies specializes in snapping theatrical celebrities—just for fun, and has amassed a great collection. The photograph below of Helen Morgan was made in her hotel room in New York City. "Camera: Contax, lens opening about $f2$. speed $1/25$, natural light, film, Eastman's super X." Have you ever thought of specializing? Read MINICAM's October article on that subject.



HELEN MORGAN

BY MAC NEILL DAVIES



Fig. 1. Univex
"8" movie camera.

MOVIES

1938

STYLE

By William Mundine

What the minicam has been to still photography the 8 mm. movie camera has been to the field of motion pictures. Many *Minicam* readers are interested in movies as taken by simple, inexpensive cameras. Here is the first of a monthly series on movies, the minicam way.

ABOUT ten years ago everyone was making movies. Never in the history of photography had any branch of the art known such popularity; but with the financial crash, the movies crashed as well. Personal motion pictures were apparently in the permanent discard, although the 16 mm. films found life in the newly developed commercial and industrial fields. The talkies invaded this field and the efforts of the manufacturers were directed toward producing equipment which would best serve the purposes of the commercial film users.

Eastman had introduced the 16 mm. film originally, and again they took the initiative and introduced a split 16 mm, or the 8 mm. film. The reception given the "8" was exactly that given the "16" when it was introduced; ridicule and derision. Technical data was introduced by the ton to prove that the "8" could never be practical. Experts rose by the legion to prove that the "8" could never be screened in

size larger than ten inches—but like the "16", the "8" proved itself in performance. The result is that today the "8" is firmly established as the logical personal film size.

It would seem that the experience with the "16", which grew from a rather crude experimental film for tiny screens to a professional film which could be projected upon a sixteen-foot screen with brilliance would have offered an analogy, but this experience was disregarded. It is true that the original "8's" were somewhat in the toy class, but today with good 300-watt projectors, a brilliant screen image from thirty to forty inches wide, and with excellent definition has proven, not only that the "8" is here to stay, but also that if there should ever be any good reason for so doing that the film could be still further reduced in size!

During the past twenty years, something like sixteen million still cameras were sold.

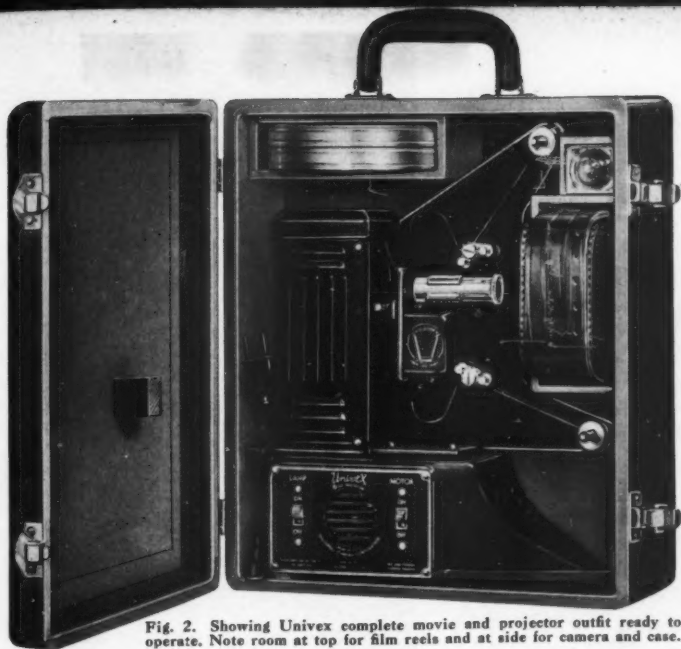


Fig. 2. Showing Univex complete movie and projector outfit ready to operate. Note room at top for film reels and at side for camera and case.

During the same period the sale of motion picture cameras was about half a million! A difference of thirty-two to one. A glance at the history of the miniature still camera provides the answer.

Nothing like the vogue of the minicam has ever been known in photography. The minicam offers an instrument in small size, one easy to carry, easy to operate and, above all, representing a cost in initial investment and carrying charges within the means of the average person. A little thought will show that the same reasoning can be applied to the movie "8".

Here for the first time we have an efficient motion picture camera which can be carried as an incidental when going for a hike or spending a week-end out in the country. It can be dropped into a pocket of your jacket and you forget it until you are ready to use it. No longer do you have to plan a day devoted exclusively to photography and then start out with a young trunk slung over your shoulder by a strap which soon cuts into your shoulder like a knife.

The "8" is small, it is light, its very size makes practical high aperture fixed focus lenses so that with a more or less careful attention to the stop being used you just point and shoot. And, thus simplified, you don't have to start thinking in terms of

three-figure money. The usual "8" camera uses a film which is 16 mm. thereby twenty-five feet long. It will record the identical action which would require 100 feet of 16 mm. thereby cutting operating cost precisely in half. You can get 8 mm. film for as little as 60c a roll in a thirty-foot length for the Univex, excluding processing charge, up to about \$2.25 in the longer roll and including processing.

However, there is one thing which above all else has made the "8" popular; this is color film. It is surprising to learn that almost half the film footage now being used is color film. The color results obtainable with the "8" are far better than most beginners expect; the result is that when once a color film has been tried, very little black and white is used. The cost of color is slightly more than black and white, but far less than double so that almost every owner will cut down on his footage, if necessary, in order to shoot all color.

The minicam owner takes to color more slowly because he cannot obtain his usual pictures, i. e., those on paper, without great difficulty. The movie fan on the contrary is accustomed to the projected picture so that color offers nothing new in procedure. He loads with color film, shoots as usual and when he projects in the ordinary manner, his pictures are in full color and color which is remarkably true to the original.

YES, the "8" is here to stay. These facts have been easy to state, but the truth of the quality is doubted by many people who have never seen "8" film projected. Of course quality is not at all a definite term, but at least the sharpness of

the film can be stated in quite definite style. For example, in a shot where the background was the brick wall of an apartment building sixty feet of which was included in the field, every individual brick was easily discernible, right to the extreme corners of the screen. When sixty feet are shown on a thirty-inch screen, it means a half inch of screen shows a foot of the original. As bricks are only eight inches long, this means that the screen image of the bricks would be roughly $\frac{1}{8} \times \frac{1}{3}$ inch—yet they are clearly shown. There are many sixteen millimeter cameras which will not do as well.

Movies seem to most people to be very mysterious and difficult. There are some factors which must be borne in mind if you want the best results, but as far as the photography is concerned you know that apertures of f 2.7 and f 3.5 are for dark conditions. That is easy to remember. You also know that you will only use f 11 and f 16 in bright sunshine or on the beach. This leaves you f 5.6 and f 8 for ordinary shooting. Many owners of the "8" leave the lens set at 8 and don't try to shoot in the dark because there is not much brilliance in the original. If the correct exposure is 5.6 or even 3.5 and you shoot at 8 you will get quite fair results. With color, of course, it is advisable to use a meter and set the lens exactly, but for black and white the range of error which will produce usable results is enormous.

Because of this fact, total failure through exposure error is almost unknown. Inasmuch as the "8" cameras usually have some exposure guide built right into the camera, the veriest tyro may confidently expect his first film to be satisfactory as far as exposure goes.

How To Make Your First Movies

EXPOSURE is not everything. There are some points which you must observe if you want your films to be satisfactory in every way. The worst mistake made by beginners is that of thinking that the camera is an exact mechanical duplicate of the eye. Roughly this is true, but there are too many points of difference to let the statement pass unchallenged.



Fig. 3. Bell & Howell Filmo "8" movie camera.

When we look at an object, we see nothing else sharply. The background is diffused and unless it has very strong contrasts we are hardly aware of it at all, but in the picture it is as sharp and definite as the object of interest; and as it is all in one plane we are fully conscious of it. If you shoot an open air stage where there is a crowd around, your film may as well show the dancers as miniature figures dancing on the head of a spectator as upon the stage. That is an extreme example, but the phenomenon of trees growing out of people's heads is too common to be funny. Watch your background and see that it forms a proper setting for the subject.

The camera determines the horizon. We instinctively feel that the horizon is straight across the screen and if the camera was held out of plumb, we cannot accept the tilted horizon, but feel that the buildings and other objects shown are falling over. Therefore it is necessary to cultivate the habit of holding the camera plumb. This is not difficult for there is almost always some guiding object; the corner of a building, even a person standing upright, a telegraph pole or a fence post. Just make sure that these objects are parallel to the sides of the finder and your films will show

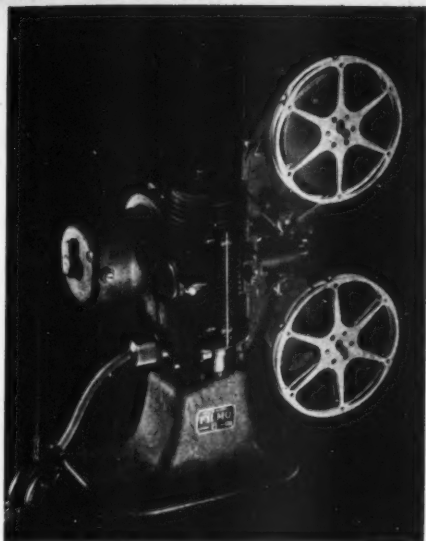


Fig. 4. Bell & Howell Filmo 8 mm. projector.

the benefit. Even if you tip the camera upward and so cause the sides of buildings to tip toward one another the sides of the finder form guides to show you when the tilt is uniform on both sides.

Of course this does not apply to those cases where you are working for some special effect and deliberately tip the camera to one side; but these are cinematic devices to be used after you have thoroughly mastered the fundamentals of making good films.

Another very bad habit of the beginner is to use the camera as he does his eyes and turn it constantly from side to side. This is most trying and is one of the principal reasons why beginners tire of their cameras soon. The eye does not get the natural effect upon the screen, but instead sees only blurred images rattling back and forth across the screen in a succession of streaks. The camera should be held still. Let the object cross the field of view, then the eye can follow the object upon the screen in the natural manner. There are a few permissible exceptions to this rule. At a horse race, for example, it is permissible to follow *one* horse. Do not jump from one to another. Keep this one horse in the center of the finder. The screen effect will be a background badly blurred, but the object of interest, the horse, will be sharp and distinct. Another exception is in the

case of long or tall objects where the entire area cannot be shown in a single setting of the camera. In these cases the camera is slowly moved to take in the entire object, but the motion must be S-L-O-W. A good guide is to count seconds as you expose, allowing six seconds for any given point of the object to cross the finder from one side to the other. In counting seconds *count slowly enough to enunciate distinctly*:

ONE—one thousand, TWO—one thousand, THREE—one thousand, and so on. You will find that counting this way will enable you to count very close to exact seconds. It is a method used by hundreds of professional photographers for timing long exposures. After a little experience your error will be found to be less than three seconds in a minute.

Another factor is the determination of the point of view distance. You look down the street and focus your attention upon some group there. You raise the camera and shoot confidently expecting the screen image to more or less duplicate your direct visual impression. When you see the picture with the object a tiny speck in a screen filled with unimportant detail, you are sadly disappointed. Still the camera bears a finder which was put on the camera for the express purpose of showing you just what you will see on the screen. No matter how distinctly you can see the object, its size compared to the full screen size will be exactly in the proportion you see in the finder.

In the same way do not try to make portrait shots showing facial expressions when you are so far away that the full figure of your subject is in the finder. You have seen enough theatrical films to know the nature of the closeup, why not use it? Incidentally a study of theatrical films is one of the best exercises you can indulge in. Study the methods and try to imitate them. If you stop down the "8" lens to about $f\ 8$ you can work within $3\frac{1}{2}$ feet of your subject and get good closeups. And remember the final quality of the film will depend upon the amount of footage devoted to closeup and semi-closeup shots you have. Nothing is more disappointing

than a film full of long distance shots where you strain your eyes to try to see detail obscured by small size and distance. If anything is interesting enough to shoot it is interesting enough to fill the screen for at least a part of its footage.

Likewise the film made up wholly of closeups is disappointing, for there is no connection between scenes. The long shots are used as strings to tie up the story told by the closeups. If you will make use of the distance shots in this way, remembering to introduce every closeup with a long shot, you will find that your films not only *have* interest, they *keep* this interest! The only thing to be done, then, is to obtain an "8" camera, follow these simple rules and get busy. If your hands are not steady, you will find a tripod of

great value, but it is not absolutely essential.

The Univex camera is small and compact, taking 30 feet of straight "8" film, that is, the film is already split before loading into the camera. The film sells for 60c or 90c a spool, according to the type, and processing is charged for at a flat rate of 30c a spool. This permits the experimenter to process his own without paying in advance for the processing.

The Univex is adapted for use with interchangeable lenses. The regular lens may be used for most work, but if desired, the Univex owner may add any of these lenses: f 3.5 normal focal length, f 1.9 normal focal length or the $1\frac{1}{2}$ inch (three times) telephoto f 3.5.

The Univex projector has a highly effi-

Table 1.—Outdoor Exposures

COMPLETE EXPOSURE TABLE			FOR OUTDOOR SHOTS							
			Diaphragm Stops to Use With No. 100 Std. Film.				Diaphragm Stops to Use with No. 100 Ultrapan Film			
LIGHT CONDITIONS			Before 8 a.m. After 4 p.m.	8-10 a.m. 2-4 p.m.	fr. 10 a.m. to 2 p.m.	Before 8 a.m. After 4 p.m.	8-10 a.m. 2-4 p.m.	fr. 10 a.m. to 2 p.m.		
OPEN SHADE	SUMMER	BRIGHT	2.7	3.5	5.6	3.5	5.6	6.3		
		HAZY	1.9	2.7	3.5	2.7	3.5	5.6		
		CLOUDY	—	1.9	2.7	1.9	2.7	3.5		
	WINTER	BRIGHT	1.9	2.7	3.5	2.7	3.5	5.6		
		HAZY	—	1.9	2.7	1.9	2.7	3.5		
		CLOUDY	—	—	1.9	—	1.9	2.7		
CLOSE-UPS OF PEOPLE AND BUILDINGS	SUMMER	BRIGHT	3.5	5.6	6.3	5.6	6.3	8		
		HAZY	2.7	3.5	5.6	3.5	5.6	6.3		
		CLOUDY	1.9	2.7	3.5	2.7	3.5	5.6		
	WINTER	BRIGHT	2.7	3.5	5.6	3.5	5.6	6.3		
		HAZY	1.9	2.7	3.5	2.7	3.5	5.6		
		CLOUDY	—	1.9	2.7	1.9	2.7	3.5		
STREET SCENES AND NEAR LANDSCAPES	SUMMER	BRIGHT	5.6	6.3	8	6.3	8	11		
		HAZY	3.5	5.6	6.3	5.6	6.3	8		
		CLOUDY	2.7	3.5	5.6	3.5	5.6	6.3		
	WINTER	BRIGHT	3.5	5.6	6.3	5.6	6.3	8		
		HAZY	2.7	3.5	5.6	3.5	5.6	6.3		
		CLOUDY	1.9	2.7	3.5	2.7	3.5	5.6		
DISTANT LANDSCAPES	SUMMER	BRIGHT	6.3	8	11	8	11	16		
		HAZY	5.6	6.3	8	6.3	8	11		
		CLOUDY	3.5	5.6	6.3	5.6	6.3	8		
	WINTER	BRIGHT	5.6	6.3	8	6.3	8	11		
		HAZY	3.5	5.6	6.3	5.6	6.3	8		
		CLOUDY	2.7	3.5	5.6	3.5	5.6	6.3		
BEACH—SEA SNOW—SKY	SUMMER	BRIGHT	8	11	16	11	16	16		
		HAZY	6.3	8	11	8	11	16		
		CLOUDY	5.6	6.3	8	6.3	8	11		
	WINTER	BRIGHT	6.3	8	11	8	11	16		
		HAZY	5.6	6.3	8	6.3	8	11		
		CLOUDY	3.5	5.6	6.3	5.6	6.3	8		
DEEP WOODS RAVINES	SUMMER	BRIGHT	1.9	2.7	3.5	2.7	3.5	5.6		
		HAZY	—	1.9	2.7	1.9	2.7	3.5		
		CLOUDY	—	—	1.9	—	1.9	2.7		
	WINTER	BRIGHT	—	1.9	2.7	1.9	2.7	3.5		
		HAZY	—	—	1.9	—	1.9	2.7		
		CLOUDY	—	—	—	—	—	1.9		

For indoor exposure by Photoflood illumination, the following table also contributed by Univex will be found helpful.

It presumes the use either of the No. 100 U-P Ultrapan film with Univex cameras or Super Sensitive film with 8 mm. cameras.

cient optical system, giving great screen brilliance, two models are provided, one 40-watt and one of 125 watts. With the special brilliant projection lens, good pictures may be projected up to 36 inches wide.

Exposure

The following exposure tables supplied by courtesy of the Universal Camera Corporation give the exposures advised for 8 mm. film as supplied for the Univex "8". The exposures given are adaptable to any 8 mm. cameras, using the standard speeds for ordinary pan and the "Ultrapan" table for all types of supersensitive panchromatic emulsions.

Indoor Exposure Table for Use With Photofood Lamps

No. of G. E. Mazda #2 Photofood lamps	Distance of lamps to subject	Correct stop opening with lamps in photographic reflectors.	
		Standard film	Ultrapan film
1	3 ft.	1.9	2.7
2	3 ft.	2.7	3.5
3	3 ft.	3.5	5.6
4	4 ft.		5.6
6	4 ft.	5.6	8
3	5 ft.	2.7	
4	5 ft.		3.5
5	5 ft.	3.5	4.5
4	6 ft.	1.9	2.7

The above table shows lens aperture openings and the number of photofood lamps required for good exposure. Where the lens opening shown in the above table is not at the user's disposal, a slightly underexposed picture can be obtained by using a lens opening which is one "f" number smaller, that is to say, where $f 3.5$ is indicated in the above table, for good exposure, $f 5.6$ will result in slight underexposure under the same conditions of lighting and distance.

Cine Kodaks 8

The 8 mm. Cine Kodaks are made in the usual Eastman style, regular, rectangular, leather-covered boxes. The finder is incorporated in the carrying handle. The camera has a large feed sprocket insuring smooth film feed so that there will not be any screen dance when the film is projected. There are three models, the $f 3.5$, the $f 2.7$ and the $f 1.9$. The last is the de luxe model with interchangeable lenses. All these cameras are "Double 8". This means that the film is 16 mm. wide. When the spool has been run through the camera

once, it is removed, turned over and run through the camera again. This makes two strips of pictures side by side. After processing, they are cut apart lengthwise and spliced into a 50-foot strip of 8 mm. film.

The corresponding projectors are supplied with lamps ranging from 50 to 300 watt, including a de luxe model with full controls. All are designed for rapid rewinding using the projector motor.

Filmo 8

The Filmo Double-8 is made in the familiar Bell & Howell style, a metal case, bronze color, shaped to conform to the enclosed mechanism. The lenses are interchangeable and the camera unusually compact. The quality is that familiar to users of Bell & Howell equipment. As there is no feed sprocket in this camera, the size has been reduced to the minimum, making it the smallest camera available which uses the full double-8 spool of film.

The Filmo projector is a miniature copy of the B & H 16 mm. de luxe projector with gear takeup and gear rewind.

Both the Cine Kodaks and the Filmo are adapted for Kodachrome film and both are capable of giving fine quality images on a thirty-inch screen.

Keystone 8

The Keystone 8 equipment, both cameras and projectors have proven popular with those amateurs who want the Filmo type of camera, that is, oval ended metal case, at a comparatively low price. The film quality is good and the results obtained are quite satisfactory, although in buying "8" equipment as in any photographic field, you get what you pay for and naturally a camera of higher price can be expected to give better results than a cheaper one.

Projection

The question often arises as to screen size and projector distance. The following table gives the screen sizes at three distances for two lenses. Intermediate distances can be interpolated.

Screen distance	10 feet	15 feet	20 feet
$\frac{3}{4}$ -inch lens	18 x 25	27 x 38	26 x 50
1-inch lens	15 x 20	23 x 30	30 x 40

Developing The

MINIATURE NEGATIVE

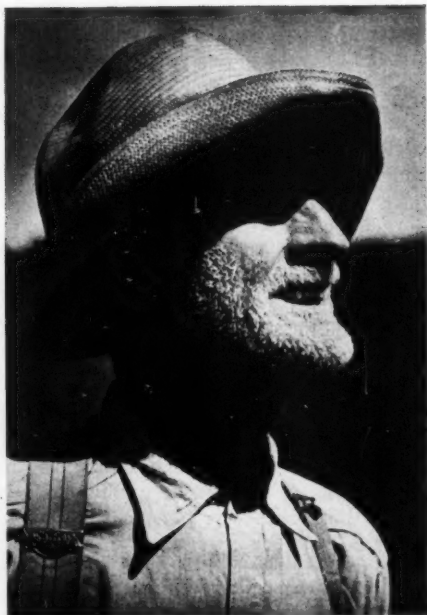


Fig. 1—The Happy Farmer by Roy Roselieve. An eloquent portrait in true character style. Exposure 1/200th at f4.5. Developed in G. D. X.

DEVELOPING miniature negatives is easy. You can make it a difficult and intricate ritual if your temperament happens to incline towards the experimental, but basically, film development is a simple business. Developing is also a good part of the fun to be had from photography. And it is one of the best ways to gain an understanding of what you are doing when you take a picture.

Modern developing technique has been so well worked out, with balanced formulae, prepared solutions and efficient compact tanks that every amateur should try his hand at it—even if only for a little while. Process a few rolls of film.

By Minicam's Technical Editors

See with your own eyes the results of under-and over-exposure. You will gain understanding about what goes on after you have snapped the shutter as well as a new appreciation of what your camera can do that will be reflected in better pictures the next time out.

EQUIPMENT

For successful developing, you need a small tank, a bottle of developer or the chemicals for mixing your own, fixing solution, a cheap thermometer, a couple of film clips, a dark closet or a changing bag and running water. You can get all these for less than ten dollars. Fifteen dollars buys first rate equipment at any photo supply store, and if you want to spend as much as twenty you are practically equipping a dark room.

The bulk of your money will be spent on the tank which, once bought will last a lifetime with reasonable care. After that, your only expense is for chemicals, which are cheap, or prepared solutions which can be used repeatedly and are very little more expensive than mixing your own. Once you have your tank you can develop an average roll of size 120 or 35 mm. film for about 3c to 5c.

You don't need a darkroom for ordinary developing. A closet into which you can get a chair or a room from which you can exclude *all* light for a few minutes will do since developing, once the tank is loaded,

A BOOK LENGTH FEATURE COMPLETE IN THIS ISSUE

can be carried out in full light. You do, however, need running water which means that your activities will be limited to the kitchen or bathroom. Again, reasonable care will prevent stains or mess.

A typical developing tank is shown in Fig. 4. Gone are the days of deep vats in which you sloshed your film about, dipping from one to another, squinting at the image and wondering whether it was about done. Modern developing by time and temperature has changed all that. The tank is small enough to be held in one hand, weighs only a few ounces. The old way may have been more exciting, but the new way is a heap surer.

Enumerating and describing the many tanks on the market would take a book. You can get them of composition, metal or even glass. There are tanks built for one size of film and others adjustable for a variety of film sizes. Some have automatic loading devices. None are really hard to load. The tank you ultimately buy will depend on how much you intend to use it, your personal preferences and the amount you are willing to spend. Consult your dealer and you won't go wrong.

If, after you have exposed a roll of films, you take it out of the camera and examine it in the light, you will not see any evidence of exposure. Immediately, you will have ruined that particular roll as you would quickly discover if you tried to develop it. What happened?

Film, any film, consists of some thin base, usually celluloid, on one side of which has been coated an "emulsion" consisting of ordinary gelatin, highly purified,

in which are suspended grains of a silver salt much as nut meats are suspended in dessert gelatin. The peculiar characteristic of this silver coating is that a chemical change takes place in it when it is exposed to light. Looking at the coating you would suppose it to be perfectly flat and even. Actually it is made up of an infinite number of little "grains" laying above, below, and alongside each other in the gelatin mass.

WHEN the light strikes the film, some of the particles are affected, others not. Those affected are converted by the light

into a black, insoluble salt. That is, in the presence of an appropriate developing agent, the light-struck grains will turn into tiny grains of pure metallic silver which are blackish gray. Where the action of the light was strong enough, almost all the grains will be converted, leaving the film completely dark. Where the light was moderate, some grains will blacken and others will not, giving that part a gray or "half-tone" effect. And where the grains were unaffected, they remain as they were originally.

Now, if you will remember that a negative shows things in reverse — hence its name — you will see what has happened. When a print is finally made from that negative the darkest parts, where the grains are all black, will not pass light so the printing paper is unaffected. The lighted parts will pass the most light, making the paper black and the in-between tones will give grays depending on how light or dark the film is.

And that's all there is to the chemistry

Taking a snapshot is only one-third of the fun. The other two-thirds are developing the negative and making your own prints. In this complete, book length feature Minicam presents the story of developing in simple, straightforward language. Included are many formulae as well as two sections contributed by leading chemical houses. There is nothing difficult about developing your own negatives as this timely article proves.

Fig. 2, right — The Legion Takes Over New York — By Roy Rose-lieve. A fine angle shot of the legion's marching thousands. Taken in Legion's "lucky weather", 3 p. m. from a building along the line of march. Exposure 1/150th at *f* 6.3. Developed in G. D. X.

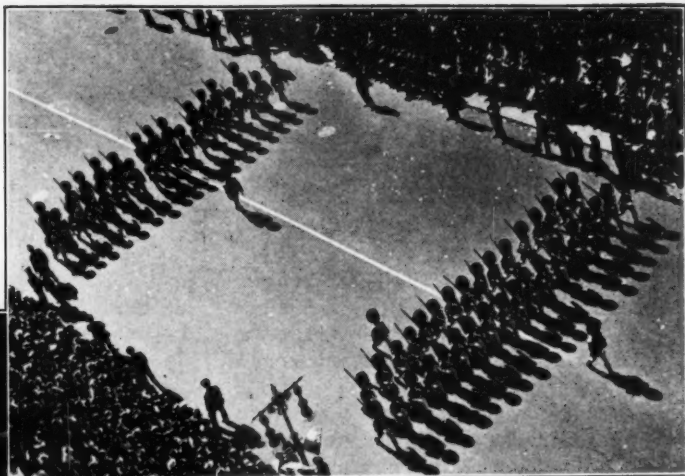
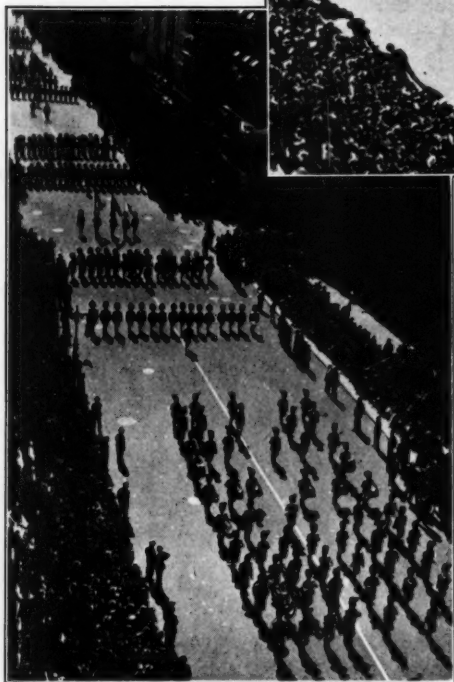


Fig. 3, below — Another Legion view, looking up Fifth Avenue. Note the tricky shadow effect to be had by holding the picture upside down. Exposure 1/150th at *f* 6.3. Developed in G. D. X.



our old friend Hypo appears. Hypo is nothing more than an agent which dissolves the grains which have not been turned into silver and so renders the film insensitive to further action of light.

Modern developing practice has inserted an intermediate step between the two basic actions. This is the short-stop. The developer is alkaline. The hypo is acid, which neutralizes the alkaline developer. But it does not get in its work fast enough. Therefore a highly acid intermediate bath is used whose purpose is only to short-stop the action of the developer, to stun it, as it were, so that the developing process will not continue for too long a time. Time is one of the two essentials of development and must be exactly observed.

MODERN DEVELOPERS

The hypothetically perfect developer might be defined somewhat as follows, "One that will convert all the light-affected grains without converting any that have not been affected by light. It is advantageous but not essential, that this be done with as little damage to the supporting gelatin as possible. If the delicate structure of the gelatin is broken down by a strong developer, the grains will touch and wherever they touch they cling as though cemented together. This gives a negative with a big grain texture. Some developers, those which might be called "vigorous" get at the most of the affected

of development unless you happen to want to know why light affects the silver salt that particular way. If your curiosity takes that bent, there are many excellent volumes on the theory of development available to you in libraries or the book departments of your favorite dealer.

THE purpose of any developer, therefore, is to convert the light-struck particles into black metallic silver. However, this is not enough. Left to its own devices, the image would gradually turn black and after a time, all of the film would be uniformly black. A further step is therefore necessitated, namely, fixation, so called because it "fixes" the image to the film. Here

grains but they blast their way to them, dissolving the delicate walls of gelatin which keep them apart, allowing the tiny grains to cluster together in big clumps.

At the other extreme are the very gentle developers that kick up a minimum fuss with grain but can't get at the ones embedded deeper in the emulsion. The result is that the full effect of the "exposure" is not utilized, hence the film appears underexposed or flat. Finally, as is usually the case, there is a vast middle ground of developers which represent a compromise between vigor and grain clumping.

Before embarking on any discussion of specific developing formulae, it would be



Fig. 4. This type of developing tank contains a reel adjustable for a number of film sizes. It is loaded by first adjusting the two halves of the reel and then slipping the film into the grooves. Loading, of course, must be done in darkness.



Fig. 5. The apron type tank. The film is wound on the reel together with a celluloid apron which keeps the layers of film from touching. Advantages are somewhat greater ease of loading. Both types are very popular.

worth our while to look at what may be called, for lack of a better term, An Average Formulae. Into this will enter a number of basic ingredients, each of which are present for a definite purpose. The actual chemicals and their proportions may differ from formulae to formulae, but their purpose will follow the stipulated requirements which must enter into any developing formulae.

Briefly stated, the Average Formulae will contain a Reducer, a Preservative, an Accelerator and a Restrainer. Some developers which are to be used over a long period may have added alcohol to prevent decomposition and a few commercial de-

velopers have added dye to make them look different. These are the exceptions rather than the rule. The four basic constituents are dissolved in water of either the ordinary tap variety or distilled.

REDUCER. This is the chemical agent which actually does the changing from the yellow silver salt to black metallic silver. It may be metol, hydroquinone, amidol, pyro, paraphenylene-diamine or others. These are the most common. Glycin also belongs in this group.

PRESERVATIVE. A solution of the reducer in water reacts strongly with the air and soon breaks down. To prevent this, a preservative is added. Sodium sulphite is ordinarily used, and as this chemical serves to reduce the grain size, when used in large quantities, it serves a double purpose.

ACCELERATOR. The accelerator is often dispensed with in surface (ultra-fine-grain) developers as its function is to open up the structure of the gelatin to permit the developer to act throughout the gelatin. If this chemical is too strong it destroys the finer gelatin structure and permits grains to touch, in which case they adhere strongly. It is this adhesion of single grains into clumps which gives a grainy negative. As surface developers do not penetrate into the gelatin, they do not need the destructive action of the accel-



Fig. 6. Showing how the film is wound on the reel with the apron type tank. The edge of the film lead is slipped into a groove and film and apron wound simultaneously. It is advisable to practice loading a tank in daylight with a blank length of film in order to accustom the hands to carrying out the operation in total darkness.

ator. The chemicals used include concentrated soda lye (sodium hydroxide), purified washing soda (sodium carbonate), household borax, tribasic sodium phosphate, ammonia and others.

RESTRAINER. The restrainer, almost always potassium bromide, is used to prevent the developer from altering the grains of silver salt which did not receive the action of light. This keeps away the gray veil or fog which spoils many negatives and permits a crisp, clean negative.

Usually these four groups are all that are needed, but sometimes you will find other chemicals. Boric acid is added to developers containing borax to keep the borax action at a uniform level.

Among reducers we find that different ones have different actions. For example, metol produces fine detail and brings out with the utmost delicacy, the gradations of tones. On the contrary, hydroquinone is a hard-working developer, building up high contrast at the expense of detail.

Right here is the place for you to learn

that detail and contrast are exact opposites. Just as soon as you begin to get strong blacks and whites of high contrast, you begin to lose delicate detail. The tonal grades which show up fine detail become lost in contrast. Too many amateurs consider a harsh black and white as having fine detail. This is altogether wrong. Detail and contrast are directly opposite.

As it is desirable to obtain a negative having enough contrast to be brilliant and at the same time to preserve gradation and detail as much as possible, ordinary developers usually contain a mixture of metol and hydroquinone. Ultra-fine-grain developers are detail developers and unless forced in development,

or given a very heavy exposure, they lack contrast. Fortunately, a negative for enlarging can have less contrast than one best suited for normal contact printing.

Now we must face one fact. About the only genuine grain size control we have is through controlling the destructive action of the accelerator to prevent clumping and the use of some agent which will actually reduce the original grain size such as an excess of sodium sulphite.

Aside from these controls research has shown that regardless of the developer used, by stopping the development at some given degree of contrast, the grain size will be the same. That means that metol developer can be used to give as fine a grain size as paraphenylene-diamine provided there is no destructive action by an alkali and that the high sulphite content is used. Some very fine grain negatives have been made by pyro, one of the oldest developing agents known.

Paraphenylene-diamine gives a good quality considering its grain size and it is easy to use and to control. It is difficult to

get a metol-hydroquinone developer to act consistently when no accelerator is used. Such are the reasons for p-diamine, not because it is inherently a magical substance which produces fine-grain.

EXPERIENCED workers have found that keeping the temperature constant until the emulsion has been hardened is the most effective fine grain control we have. It is possible to get very coarse grain with some of the ultra-fine-grain developers when the temperature is ignored.

Another point often brought out is that *over-exposure produces coarse grain*. This is because many more grains are affected. We must not forget that the "grain" to which we object in a print is made up of the images of the *holes between the grains* in the negative which permit light to pass and form black granular images on the paper!

Still another factor in grain size control is the film which is used. Very slow films are usually fine-grained while fast ones are coarser in their structure. Thus, when copies of line drawings are made upon positive film, a contrasty developer may be used such as the D-11 formulae. This developer is not at all suitable for use with a fast negative film containing graded tones when the enlarging is to be carried up to

10 x or more.

For moderate speed, fine-grained films, where the utmost in quality is desired, combined with a limited enlarging ratio, the borax type developers are to be recommended. For the ultra-fine-grain negative, using fast films and/or which are to be carried up above 10 x enlargement the paraphenylene developers are satisfactory, some variation of the Sease formulae being as good as can be found.

In the actual mixing, it is advisable to use distilled water unless you are sure that your drinking water has less than two percent of mineral or organic content. Very often failure of a developer may be traced directly to a high mineral content in the local water.

Above everything else, if you develop at 68°, keep the developer there for the entire period of development! It is better to keep a 65° developer fixed at 70° than to start it at 63° and let it run up to 70° during development. The time is more flexible. You can lengthen time to produce more contrast or lessen it to produce flatter results, but the temperature is of prime importance! Keep it uniform!

In the following section concerned with formulae you are going to encounter the word "gamma". Gamma is the numerical expression given to the exact measurement

An example of a negative developed in glycin, the old fine-grain developer before p-diamine was introduced.



of steepness of gradation. Its advantage is that reducing such gradations to a mathematical figure enables the worker, once he has determined what gamma is best suited for him, to get the same results again and again. Visual measurement is a tricky business that changes with various film bases and the nature of the light. But when you say Gamma .7 you mean one, predetermined contrast and no other. The average portrait negative should have a gamma of about .7, landscape subjects between .9 and 1.0. There is considerable variation due to personal preference. Film manufacturers publish gamma tables. They are also available with various well known formulae and are published by the sponsors of the formula, generally the film manufacturers again or the larger chemical houses.

Among the first chemists to give their undivided attention to the problems of fine-grain development were the staff members of the Edwal Company. Attacking the problem from the point of view of the chemist rather than by making rule of thumb variations of existing formulae, this laboratory advanced rapidly. They encountered the problem of chemicals of the required purity and started preparing them in their own laboratories.

This laboratory does not make any secret formula developers, but supply the raw materials from which the amateur can make his own developers. If the Edwal



Fig. 7. The Agitator in the tank. Once the tank is loaded, further operations can be carried out in the light. The Agitator is a device designed to keep the solution moving in the tank in order to prevent the formation of air bubbles which would prevent the developer from acting evenly on the film.

instructions are followed carefully, the developer made at home will be found to be fully the equal of any fine-grain developer available.

Examination of the formulae shows that they are simple; no mysterious constituents are given, with ascribed functions, as is so commonly the case in highly complex formulae. MINICAM believes that the use of a dozen or more constituents merely results in a developer which is unsatisfactory and unstable; the Edwal formulae contain everything of real value.

WE have asked the Edwal laboratories to prepare a brief discussion of the problems of fine-grain developing which is presented herewith.

The story of fine-grain during recent years has been the story of diamine (paraphenylene-diamine free base). The original diamine formulae came from France, and while they gave fine-grain, they produced poor contrast and exceedingly bad tone separation or gradations. Developers giving satisfactory contrast became available when Dr. Sease published his formulae, and the diamine glycin combination known as the Sease No. 3 is still used by many workers.

The diamine-glycin formulae, however, do not produce good gradations in the middle tones, and they require more than normal exposure for satisfactory density, and to remedy these deficiencies, experimenters began to add various amounts of metol. Prepared "secret-formula" devel-

opers of this type have been on the market for some time but the first published formula was the Edwal-12, which has become quite popular for speed work.

EDWAL-12

	<i>Metric</i>	<i>U.S. System</i>
Distilled water	1 liter	1 quart
Metol (Elon, Pictol)	6 grams	90 grains
Sulphite (Anhydrous)	90 grams	3 ounces
Diamine-P	10 grams	150 grains
Edwal Glycin	5 grams	75 grains

The developing times for the common 35 mm. films are: 18 min. at 65°, 15 min. at 70°, 11 min. at 75° F. There are, however, quite a few films which require special developing times, and these are contained in the Edwal booklet "Modern Developing Technique" which may be had free at any photo-store or direct from the company, whose address is 732 Federal Street, Chicago, Ill.

The developing times given will produce a gamma of about 0.8. A 20% decrease in time will produce a gamma of 0.6 and a 20% increase, a gamma of 1.0. Development should not be carried beyond a gamma of 0.8 except for special purposes, for graininess increases rapidly at higher gammas. Roll film should be developed 10% longer than 35 mm. film and cut film and plates require 10% more than roll film.

The Edwal-12 like all developers of this type exerts a much more vigorous action on the first roll of film than on subsequent rolls and various methods of pre-aging the chemicals and silver-loading the developer have

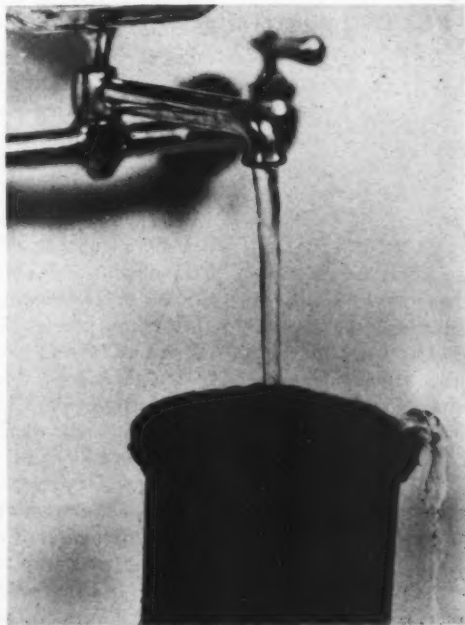
been worked out to cut down this initial energy. The simplest and best method, if you mix your own solution from fresh chemicals, is to add about 20% of used Edwal-12 solution to take the edge off the fresh batch. If it is necessary to use a fresh batch made from fresh chemicals the developing time on the first roll should be cut about 25% to avoid too strong contrast.

One quart of this developer will process ten or more 5½ foot rolls of 35 mm film. Actually the solution contains enough developing chemical to process three or four times this amount, and in commercial work in deep tanks it is used at this full efficiency. However, the amateur who must expose the solution to air a great deal in handling should keep within the ten roll limit.

The exposure meter should be pointed at the darkest part of the subject where detail is desired. Where contact prints are to be made, the larger sizes of roll film should be rated one Weston step lower than the corresponding 35 mm. film. Daylight ratings are for bright sunlight between 9 A. M. and 4 P. M. During the early morning or evening hours the red rays predominate to a greater extent and the Mazda ratings should be used. Similarly, on hazy, cloudy or smoky days, the smoke or haze will absorb a good deal of blue light and again the Mazda ratings will give best results.

The Edwal-12 developer is intended for use with short exposures. *Too much exposure produces*

Fig. 8. Washing after fixing. A steady stream of water should flow into the tank from the opening at the top. If desired, the top may be removed, once the hypo has been poured off. Washing should continue for at least 30 minutes.



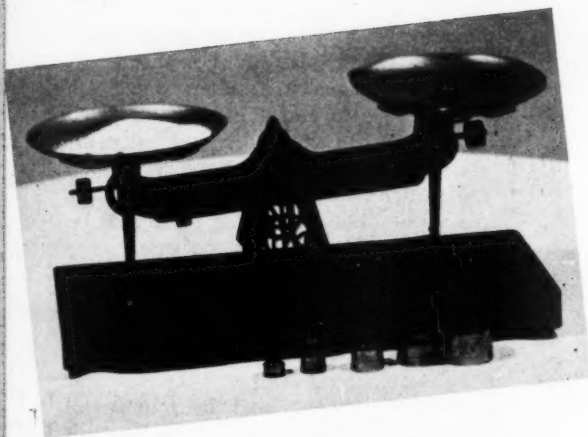


Fig. 9. Scales for measuring chemicals. Balanced formulae and consistent results depend on accurate measurements of ingredients if you insist on mixing your own formulae. Average price for scale such as shown here is \$4 to \$5.

a dense, grainy negative. If the negative-density is kept down to the proper value, enlargements to 15 diameters may consistently be obtained and with a little extra care in processing 25 diameter enlargements are possible. The Weston speed ratings which should be used with films to be processed in this developer are:

	Daylight	Mazda
Agfa Superpan	64	40
DuPont Superior.....	64	40
E. K. Super-X.....	64	40
E. K. SS. Pan.....	40	24
Panatomic	40	24
Finopan	32	20
Parpan	32	20

THE Edwal-12 developer is excellent for speed work and successful enlargements have been produced from negatives having as little as one-sixteenth the normal exposure. Any degree of contrast may be obtained by varying the developing time and the developer produces excellent gradations and tone separation. It will produce stains, however, if not washed off immediately and these stains are hard to remove. They can be removed from inanimate objects by rubbing with damp sodium hydrosulphite (not hyposulphite or bisulphite) followed by dilute acetic acid. If you have no hydrosulphite buy some

White Rit or Edwal Stain-Go. For removing diamine stains from the hands, hydrosulphite is useless. The best treatment is a 5-minute soak in 5% potassium permanganate, followed by a thorough rinse in 5% hydrochloric acid (bisulphite or oxalic acid will not do). Repeat this treatment two or three times and finally rinse the hands in sodium hypochloride solution (Chlorox) which removes the final traces of stain left by the permanganate.

Because Edwal-12 does not produce super-fine grain and because the older formulae for this purpose produced poor gradations there was a need for a developer that would give finer grain and still make first quality negatives. Edwal-20 is such a developer.

EDWAL-20

	Metric	U.S. System
Distilled Water.....	1 liter	1 quart
Gradol	5 grams	75 grains
Sulphite (Anhydrous)	90 grams	3 ounces
Diamine-P	10 grams	150 grains
Edwal Glycin.....	5 grams	75 grains

The developing times for the common 35 mm. films are: 22 min. at 65°, 18 min. at 70°, 14 min. at 75° F. For the films which require special times data is given in the free booklet, "Modern Developing Technique." As with Edwal-12, roll films require 10% more time than 35 mm. film.

This developer consistently produces negatives capable of 25 to 30 diameter enlargement and, with care, negatives that can be enlarged almost indefinitely without the appearance of grain. The developing times given produce a gamma of 0.75 which is suitable for most landscape and portrait work. If more contrast is desired it may readily be obtained by longer development. One quart of developer will process at least ten 5½ foot rolls of 35 mm. film but because of the restraining action of the bromide absorbed from the first rolls, the exposure on the last five rolls should be increased 50% over that used on the first five.

The Weston ratings recommended for 35 mm. film developed in fresh Edwal-20 are:

	Daylight	Mazda
Agfa Superpan.....	50	32
DuPont Superior.....	50	32
E. K. Super-X.....	50	32
E. D. S. S. Pan.....	32	20
Panatomic.....	32	20
Finopan.....	24	16
Parpan.....	24	16

Both Edwal-12 and Edwal-20 give best results when development is carried on at 70 to 72° F. But any temperature from 65 to 70° may be used successfully. This allows development to be carried on at room temperature and eliminates the necessity of juggling temperatures with developer, rinse, and fixer.

Like most successful fine grain developers Edwal-12 and Edwal-20 operate in an almost neutral solution. It is interesting to note that neither Gradol nor Glycin exert any developing action whatever if no Diamine-P is present. In the presence of the diamine, however, both of the other constituents exert as vigorous a reducing action as they ordinarily would in a much more alkaline solution. It is this capacity of diamine for initiating development in solutions of low alkalinity that has made the developers containing it so successful in producing fine grain without sacrifice of film speed.

Diamine developers produce a light colored silver deposit rather than the blue-black of the M.Q. developers. Thus, Edwal-12 negatives are yellowish black, and Edwal-20 negatives are yellowish brown. Many negatives which appear thin because of this light color, still have plenty of silver for enlarging purposes. Indeed, if these developers should produce a black image it would be a sign of gross over-exposure or over-development and the negative would be grainy.

In this connection, diamine developers which produce black images sometimes do so because they have absorbed alkali from bottles in which they have been stored. No fine grain developer should be kept in a bottle which has previously held an alkaline developer such as M.Q. for the glass will absorb alkali from the solution

and later release it into the fine grain developer with disastrous effect on the grain. Some types of clear glass give off alkali of their own accord and as a result, fine grain developers should be stored in amber bottles or pyrex flasks unless the previous history of the bottle is known.

ADDITIONAL FORMULAE

There are some cases where a fine grain developer is not used, and others where the quality of borax is preferred even at the cost of some fineness of grain size. For this reason we will present some typical developers which do not belong to the fine-grain class and one or two additional fine grain ones.

FOR HIGH CONTRAST ON SLOW FILM, for micro copying and similar work. E.K. D-11.

Water at 125 degrees.....	16	ounces
Metol or substitute.....	15	grains
Sodium sulphite, anhydrous.....	2½	ounces
Hydroquinone.....	130	grains
Sodium carbonate, anhydrous.....	365	grains
Potassium bromide.....	73	grains
Water sufficient to make.....	32	ounces

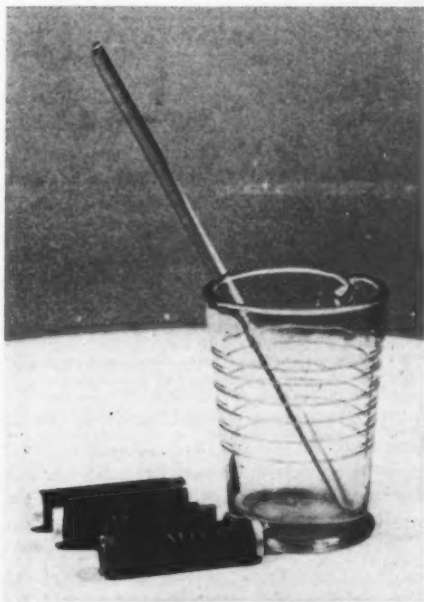


Fig. 10. Graduate, stirring rod and M-Q tubes. The tubes contain a standard prepared developer. Graduate and stirring rod are essentials for measuring liquid quantities in mixing developers. A graduate is also a convenience when pouring the solution into or out of the tank.

Use undiluted. Time 5 minutes for micro-file, 4 minutes for positive at 65 degrees. These times do not apply to ordinary negative film which require longer times of development.

AGFA 101. FINE GRAIN DEVELOPER OF THE BORAX TYPE. High quality, moderate grain.

Metal or substitute.....	10 grains
Sodium sulphite, anhydrous....	2 oz., 75 grains
Hydroquinone	13 grains
Borax	10 grains
Water to make.....	32 ounces

Develop for 12 to 16 minutes at 65 degrees. Gives a usable fine grain and high tonal quality. Typical of the borax developers, maximum high quality.

DUPONT ND-3 ULTRA FINE GRAIN. Surface developer for twice normal exposure.

Sodium sulphite, anhydrous.....	3 ounces
Paraphenylenediamine base	72 grains
Glycin	28 grains
Water to make.....	32 ounces

Time 15 to 20 minutes at 68 degrees. For fast negative film.

ULTRA FINE GRAIN FOR NORMAL EXPOSURES.

Paraphenylenediamine base	154 grains
Sodium sulphite, anhydrous.....	3 ounces
Glycin	100 grains
Water to make.....	32 ounces

Dissolve the p-diamine in about ten ounces of hot water. Dissolve the sulphite and glycin in water at about 100 degrees. Cool the p-diamine solution, mix the two and filter through cotton. The solution has a slight brown tint. Time from 12 to 18 minutes at 65 to 68 degrees. This is one of the best all around fine grain developers.

UNDEREXPOSURE

THERE is always the question of developing the underexposed film. Of course the only sensible remedy is not to underexpose, but when it has been done and the negative cannot be made again, the best thing to do is to try to get the best possible out of the negative.

Fortunately, modern fine grain developers act upon only a part of the exposed silver salts, so the underexposed film is not really so in many cases. Here we merely resort to the use of a normal developer, knowing full well that the grain size will

be larger than if the ultra fine grain developer had been used. Recourse to the full strength developers with alkali in them would only ruin the negative for any practical degree of enlargement, so the best thing to do is to develop the film in a borax developer such as the Agfa 101 or the well known formulae E. K. D-76 and the DuPont ND-1.

The principal thing to avoid is overdevelopment. The natural inclination is to force the development to compensate for the underexposure and this is the surest way to ruin the negative. There is a natural high contrast in underexposures, for the highlights have been fully exposed and it is only the halftones and shadows which suffer from the underexposure. Long development only intensifies the highlights, for no developer can bring out an image where the light has not recorded one.

For over exposures, do not underdevelop, or you will have no contrast. Go right ahead and give full development and then reduce in Farmer's solution. This actually reduces the grain size. This, too, will be discussed in the after treatment, a subject for a forthcoming article in MINICAM.

After development, the negative is placed in a hardening bath which hardens the gelatin and prevents the film from becoming easily scratched. This hardening bath is:

Water	16 ounces
Chrome alum	145 grains
Sodium bisulphite	145 grains

This solution does not keep. It must be made up the same day it is to be used. The developer is poured off the film and the hardener is poured on. The tank is agitated constantly for one minute and the hardener left upon it an additional four minutes. It is then poured off (not kept for re-use) and hypo poured on the film. Some workers use hardener hypo after the hardening bath and others use simple acid hypo.

These are made as follows:

Hardener hypo.

Water at about 120 degrees..	20 ounces
Pea or rice hypo.....	8 ounces
Sodium sulphite	1/2 ounce
Glacial acetic acid.....	1/2 ounce (fluid)
Potassium (white) alum.....	1/2 ounce
Cold water to make.....	32 ounces

Acid hypo.

Water at about 120 degrees.....	20	ounces
Pea or rice hypo.....	8	ounces
Sodium bisulphite	3/4	ounce
Water to make.....	32	ounces

Both, when fresh, will fix the film in ten minutes and in about an hour will show a definite loss of fine detail, so the hypo should be used fresh and used for only a comparatively few rolls. The time may be set at between ten and fifteen minutes.

After fixing, the film should be thoroughly rinsed four or five times in running water, then the tank set so that a fairly forcible stream falls into the center of the film reel, and left for at least twenty minutes. Thirty is better.

When the washing is done, soak a pair of viscose sponges and press them out as dry as possible. Remove the film from the reel, drain a second or two and pass them two or three times between the two sponges to remove the surface water. Hang in a moderately warm, dry place to dry. When the films are dry, polish them with a soft cloth or chamois dampened with carbon tetrachloride and they are ready for use.

MANY minicamerists do not have facilities for mixing their own solutions, and for them prepared developers will serve admirably. The recognized prepared developers such as G. D. X., M. P. G., Infinol, and others will give perfectly satisfactory results when used according to directions, and are certainly more convenient for the amateur who lacks adequate working space or other facilities.

In our first issue, we presented data and other information regarding Infinol. We have asked the Fink-Roselieve Company to prepare a short discussion of their G. D. X. for publication in these pages, and present it herewith.

After careful and painstaking experiments and research, this developer (G. D. X.) has been designed to eliminate many of the faults which were common with the average developer designed for fine-grain development. In addition, many useful functions and features have been added to the performance of G. D. X. It

**Make Your Own
ENLARGEMENTS with this**

**LUCKY
ENLARGER**



**COMPLETE
\$57.50**

- Schneider F.4.5 Anastigmat Enlarging Lens.
- Metal Negative Holders.
- Complete with Masks from 3 x 4 cm. to 6.5 x 9 cm.
- Linear Magnification, 7 times.
- Double 4 1/2 inch Condensers.
- 100-Watt White Opal Enlarging Lamp.
- Exact Focusing.

Besides the above big features, the Lucky has a base board of seasoned plywood, size 18x22 inches. Standard equipment includes complete printing easel and extra metal lens flange for Leica lens. We have a limited supply of these big value enlargers. Order yours now!

FREE! Write now for our new, FREE catalog of Cameras and Photographic accessories. 84 pages of interesting items for the amateur photographer!

MARKS & FULLER, INC.

In the Heart of the World's Photographic Industry Since 1860
DEPT. MC-14 ROCHESTER, N. Y., U. S. A.

Ten Outstanding Camera Values

(NEW AND RECONDITIONED)

6x9cm. Plaubel Makina, coupled Range finder, F:2.9 lens.....	\$125.00
Kodak Pupille, F:2 Xenon lens	\$42.00
Zeiss Super Ikonat "C" Tessar F:4.5 lens coupled Range finder..	\$63.00
6 1/2 x 9cm. Film Pack Camera, Double extension bellows, F:4.5 lens in Derby Shutter, speeds 1 to 1/300 second, new....	\$22.50
9x12cm. Double extension Film Pack Camera F:4.5 lens in Vario shutter, new	\$22.50
Foth Derby, 1/2 V. P.	\$45.00
Xenon F:2 lens.....	\$45.00
35mm. Robot, F:3.5 Tessar lens—like new	\$75.00
35mm. Pollux F:4.5 lens in focusing mount, automatic film counter, slow speed shutter, complete with Eveready case. New.	\$22.50
Supersport Derby, 1/2 V. P. coupled range finder, F:3.5 lens.....	\$34.50
Leica Model G, F:2 Summar lens—like new	\$137.50

SOLD SUBJECT TO A TEN-DAY TRIAL
Liberal Trade-In Allowance On Used Equipment
SEND FOR COMPLETE LIST No. 24

Leica & Contax Cameras
And ACCESSORY LENSES—Fully Guaranteed
Priced Right—Send for List No. 22

FOTOSHOP, INC.

136 W. 32nd St. Dept. K. F. New York City

For Your Miniature Camera

We offer a selection of lenses in excellent condition.

For the Contaflex—

85 mm. f/4 lens	\$ 55.00
135 mm. f/4 lens	70.00

For the Contax—

50 mm. f/2.8 lens	45.00
50 mm. f/2 lens	62.50
50 mm. f/1.5 lens	120.00
180 mm. f/2.8 lens	275.00
85 mm. f/2 lens	130.00

For the Leica—

28 mm. f/6.3 lens	45.00
50 mm. f/3.5 lens	35.00
50 mm. f/2.5 lens	45.00
50 mm. f/2 lens	62.50
73 mm. f/1.9 lens	89.50
9 cm. f/2.2 Thambar lens.....	87.50

Abe Cohen's Exchange, Inc.

"The House of Photographic Values"

120 Fulton Street New York

LEICA and CONTAX USERS

"Load Your Own"

35mm Motion Picture Negative Tested and Guaranteed
EASTMAN DU PONT
SUPER X 25 ft. for \$1.00 SUPERIOR
4c per additional foot, postpaid in U. S. A.

CAMERA EQUIPMENT, INC. 1600 Broadway
New York City

16mm—HOME MOVIE FANS—8mm

A handling charge of 25c brings

1. FREE PROJECTOR OFFER
2. Three artistic END TITLES 8mm or 16mm
3. Sample copy HOME MOVIE MAGAZINE
4. How to obtain 1 yr's. subscription FREE
5. HOLLYWOOD ART EXCHANGE SERVICE
6. Complete lists of 8 or 16mm. Cartoons, Travelogues, ILLUSTRATED HOLLYWOOD ART CATALOG, etc.

PACIFIC CINE FILMS

1454 N. Gardner, Dept. B. Hollywood, Calif.

Christmas Suggestions—Cameras—new and used—
Binoculars—Barometers, etc. Send for Catalogue.

6x9 Ideal A F.4.5 Tessar Compur. Perfect.....\$50.00
Presto, 8 or 16 on 120 F.3.8 Lens. Compur. Shopworn.... 27.00
Presto, 8 or 16 on 120 F.3.8 Lens with 1/150 Pronto 11.. 23.50
Dolly, 8 or 16 on V.P. F.3.5 Lens. Compur. Sample..... 21.50
Super Sport Foth Derby. 1/4 V.P. F.3.5 Lens, 1/500
Focal Plane Shutter, coupled range finder... like new 33.00

SCHOENIG & COMPANY, Inc.
Eight East 42 Street, New York City

"PHOTO-KINKS"

A series of handy photographic reference books, 64 pages—300 new photo aids in each issue. Numbers 1, 2 and 3 now ready.

each Huddle Publishing Co. each
25c 405 Loeb Arcade, Minneapolis, Minn. 25c

can be used at temperatures ranging from 65° to 75° with perfectly uniform results. Development of emulsion proceeds in this developer at a definite even ratio. Shadows and highlights are developed proportionately, thus eliminating the common fault of lack of shadow detail. It will always produce brilliant negatives if handled according to instructions supplied by the manufacturer. Stability of this developer is excellent. Each quart of developer will develop 15 to 17 full 35 mm. rolls without necessitating increase of time in development until at least 12 rolls have been developed.

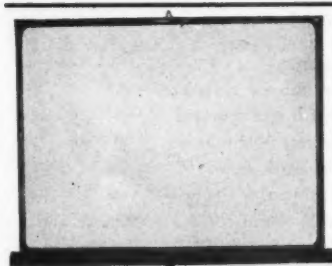
This developer contains, besides para-phenylene and glycin, two new developing agents which have been prepared especially for G. D. X. These two developing agents are mainly responsible for the excellent quality of negatives which can be produced with this developer. Films should be exposed normally according to the Weston ratings, and good results are obtained with slight under-exposures. This developer is not affected easily by climatic and temperature changes. It can be just as safely used in the Arctic as in tropical countries without running the risk of the developer excessively swelling the emulsion. As a matter of fact, G. D. X. keeps the gelatin in such good condition, that it practically eliminates the use of additional hardening baths.

For those who do not care to bother with hypo mixing, Fixol is a highly concentrated, fixing, hardening bath incorporating the best qualities of an acid fixing hardening bath and which can be used at a dilution ranging from three to five to one. This concentrated fixing solution contains an entirely new type of hardening agent which is extremely stable and at the same time renders the whole concentrated solution stable by acting as a preservative of the concentrated thiosulphate solution which, under normal conditions, would deteriorate very easily and rapidly. Fixol may be kept either in concentrated or in its diluted form for an indefinite period. The use of Fixol does away entirely with the use of a short stop bath for films and can be used very effectively in conjunction

with all developers existent. Fixol can be used with both films and papers.

Another widely used prepared developer is M. P. G. Obviously, photographic development is a chemical process of known type and just as obviously there are certain chemicals used which do the work better than others. There is an endless list of chemicals which can be used, but a comparatively short list of those which are really satisfactory.

As pointed out in the instruction prepared by the Edwal Laboratories, it has been proven time and again that the home-made formulae will produce just as good results as any commercially prepared developer. It is only a matter of your own convenience. If you wish to make your own you may do so with full confidence that it will do everything a developer can do; if you wish to avoid the trouble of mixing your own, then the prepared developer will give you fully satisfactory results. This choice lies in your own time and inclination.



DA-LITE STANDARD
CHALLENGER

Set-Up in 15 Seconds

Simply open the legs of the tripod, lift the screen fabric from the case, hook over the goose neck on the rear support and raise to position. You can adjust the Challenger in height to meet any projection requirements.

FREE Literature...

Mail Coupon Now!

**QUALITY SCREENS FOR MORE
THAN A QUARTER OF A CENTURY**

LABORATORY GUIDE TO DEVELOPMENT

Beginners who hesitate to try their own developing without personal guidance can approach the problem with full confidence by following this laboratory guide step by step.

1. Remove exposed film from camera, or from temporary storage.
2. Break seal, if the roll has been sealed.
3. Place rubber band around film roll temporarily.
4. Take roll and complete tank into darkroom (or place in changing bag).
5. Open tank, set cover at one side and remove film reel.
6. Remove rubber band from film roll and turn back end of leader.
- 6a. In case of magazines, disregard steps 2, 3, and 6.
7. Shut door, turn out light or close changing bag.
8. Unroll film and tear off leader. (Or remove film from magazine).
9. Wind film on film reel, method according to your specific tank.
10. Place the loaded reel in the tank.
11. Place cover firmly on the tank.
12. Open the door or remove from changing bag.

For Utmost Convenience Choose THE CHALLENGER!

IT CAN BE SET UP INSTANTLY ANYWHERE

Making a place for the screen is one job you won't have to worry about when you own the Da-Lite Challenger. This screen can be set up in less than 15 seconds.

The sharpest, clearest pictures you have ever seen! No sparkling! No glare! The surface is glass-beaded by Da Lite's new, advanced process. The beads are guaranteed not to shatter off. The Challenger is only one of many styles in the world's largest line of projection screens. Ask your dealer about Da-Lite Screens! Mail coupon below for facts.

DA-LITE SCREENS

Da-Lite Screen Co., Inc.,
Dept. M, 2723 N. Crawford Ave., Chicago, Ill.

Please send your **FREE** literature on Da-Lite Screens.

Name.....

Address.....

City..... State.....



FOTH FLEX

The only Twin-Lens Reflex available with an f:2.5 anastigmat lens.

Shutter speeds from 2 seconds to 1-500th second. Takes 12 2 1/4 x 2 1/4 pictures on 120 roll film.

Built-in Critical Focusing Magnifier. Brilliant, right side up, full size image. Self erecting hood.

Sold on 10-days FREE TRIAL PLAN, MONEY BACK GUARANTEE.

Your used equipment accepted in trade. Unusually liberal allowances. Write today for complete details.

complete with
f:2.5
Anastigmat lens

\$80

with f:3.5

\$60

at your dealer or from

HOME FEATURETTES & CAMERA CO.

4015-A Broadway,

New York City

LARGE COLOR PRINTS

ON PAPER FROM YOUR

KODACHROMES

Write for prices and information

Ruthenberg Color Photography Co.

"America's Colorist Pioneers"

4961 Sunset Boulevard, Hollywood, Calif.

"WHAT YOU CAN DO WITH A HOME MOVIE!"

FREE BOOKLET reveals a world of New Happiness for yourself, family, friends! Low priced outfits. Small payments. Don't miss it! Your copy is waiting! Just address **DON ELDER**, 739 Boylston Street, Desk MC-11-37. Boston, Mass.

HOW TO MAKE MONEY

Thousands of publications buy MILLIONS of photos from free-lance camera owners every year. We show you what to photograph, how to do it, where to sell for biggest profits. Learn at home. In spare time. Pay for course in easy monthly installments. No special camera needed. Write for FREE BOOK telling about this fascinating new field. **UNIVERSAL PHOTOGRAPHERS, Inc.**, Dept. 10311, 10 West 33rd St., New York City.

**WITH
YOUR
CAMERA**

CAMERA EXCHANGE

RIFLES, Shotguns, Target Pistols and other firearms accepted in trade at liberal allowances on Leicas, Contaxes, Graflexes, Weston meters, and all photographic equipment, motion picture and "still." Authorized dealers for every leading manufacturer, including Zeiss, Leitz, Eastman, Bell & Howell, etc.

NATIONAL CAMERA EXCHANGE

(Est. 1914)

9 SO. FIFTH ST., MINNEAPOLIS, MINN.

It is always advisable to practice loading the reel with some discarded film until you can do this easily in the dark. Whether in the dark closet or changing bag, it is not advisable to use any kind of light whatever, even the "safe" lights are not too safe with panchromatic film. When the tank has been loaded it is taken into the room where the actual developing is to be done, often the kitchen or bathroom.

13. The developer temperature is taken and brought to 65, 68 or 70, the temperature depending upon the solution used. Usually 65. Run warm water over the bottle to raise temperature, set in a vessel of ice water to lower it. If the room and tank are about 75, reduce the solution to two degrees lower than normal as the tank will warm it up.
14. Pour the developer into the tank.
15. Agitate tank gently to make sure it is full. Bubbles sometimes block the entrance and the tank is only half filled.
16. Set timing clock for the desired time, less a half minute.
17. Agitate the tank manually every two minutes. (Mechanical agitator is preferable. Do not allow tank to remain stagnant.)
18. When alarm sounds or time is up, empty tank at once. If it is a tank which empties slowly set the timer a full minute short of normal time.
19. Pour on chrome alum hardener.
20. Agitate for one minute.
21. Let tank set four minutes.
22. Pour off hardener.
23. Pour in hypo.
24. Agitate by hand for a half minute and let set for fifteen minutes.
25. Open tank and pour off hypo.
26. Flush out tank under running water five times.
27. Set open tank under faucet and set timer for thirty minutes.
28. At alarm, turn off water, remove film and rub down with viscose sponge which has been saturated with water and squeezed out.
29. Examine film to see that there are no water drops on surface.
30. Hang the film to dry in moderately warm, dry place with circulating air.
31. When film is bone dry, polish by rubbing back (shiny side) with a flannel or chamois pad moistened with carbon tetrachloride.
32. Sponge face (dull side) of film with the tetrachloride.
33. Cut in proper lengths and place in filing envelope.
34. File envelope containing film.

A Merry CANDID CHRISTMAS

By Karl A. Barleben, Jr., F. R. P. S.

IT may seem a bit previous to think about making Christmas cards when November has just begun to roll around. There always seems plenty of time until, one morning, you wake up and there it is, practically Christmas again and, of course, too late to do anything about it for another year. Right now is the proper time to start doing something about it.

To the first question, why an individual card, the answer is simple enough. A Christmas card, like any greeting card is a personal message of good will. The more individual it can be made the more surely it will convey the message, and the more gaudy and stereotyped, the less of your personal good wishes it carries. Therefore, don't consider your home made card as being even in the same class with the commercial product. You are not expected to and you need not worry over tinsel and multicolored printing. What you will be sending will be a small fragment of your own personality.

Greeting cards can be made in such a variety of ways that it really is an individual problem. One of the easiest ways is to buy a set of negative masks (cost about \$3.00) which provide the conventional greeting, neatly lettered, and an aperture of 2 x 3 inches for the insertion of your own negative to be used as the illustration. Where your list of friends is considerable

these masks will take a lot of the toil and sheer labor out of the job.

Basically, a photographic Christmas card is a photograph with a cryptic legend

included for good measure. If prepared masks sound too artificial you can do your own lettering in one of several ways. First, you can etch the letters out on the emulsion side of the film, but that's tricky because you'll have to letter backwards. Such work produces black lettering. Or you can do the lettering with India ink on the glossy side of the negative film in which case you letter from left to right in the usual way. The resultant words will appear as white in the finished print.

From here on any and all conceivable variations are in order. Wide or narrow white borders, horizontal or vertical line schemes, fancy wording, multiple print borders . . . it all depends on how facile you are with a pen and brush. Bear in mind, however, that simplicity is always in good taste. The fewer dodads you include the more effective will be your card.

What to put into the picture area is generally not nearly so much of a problem as designing a simple, effective card. If you are not one of those fortunate few able to do effective lettering you don't need to give up hope. There are still two recourses available to you. First, any

Comes sundown, and with it an extra chill in the air and you'll want to settle down in the easy chair by the fireplace and think about Christmas. You'd better do more than just think, though, if you want to send out any of those distinctive, individualized Christmas cards this year. Why not try making your own this year? It's fun and it's easy as explained in this article by *Minicam's* candid camera editor.

What Would You Have Done?

We read in the papers one Sunday afternoon about Albert Mingalone, a news staff photographer who was taking movies a half mile up in the air from the hind end of a balloon. The rope anchoring him to the ground snapped, and Albert Mingalone shot off into space. Death seemed certain. Across the country, blown by a ferocious wind went the big bunch of hydrogen balloons with Mingalone hanging on for dear life. Friends followed him by car, by plane, and on motorcycles across fields. They took pot shots at some of the balloons to puncture some, and bring the bags down. Mingalone dropped his camera (A Bell and Howell). That's all the papers said except that "eventually Mingalone was saved".

We immediately phoned Mingalone's employers long distance and asked if we could speak with him.

"Sorry," they said, "he's on the job, covering the World Series!

We phoned the ball park, and an obliging telephone operator strung a microphone down on the playing field where Mingalone was busily at work snapping baseball action pictures.

"Sure, buddy," said Mingalone, "it's all in a day's work. My camera? I got it with me. Naw, it didn't break. I'm using it now."

Next month, by story and picture Albert Mingalone tells about the greatest thrill of his life and what his editor said when he laid down the pictures, lit a cigarette, and said: "Here you are, boss."

MINICAM is alive to the romance and adventure of camera work. Read Albert Mingalone's story in the December MINICAM. And read with it, 22 instructive, helpful, entertaining features that will make your camera more of a joy to you.

For less than one cent an article, and many an article in MINICAM will be worth much more than that, you can read MINICAM for a full year. Decide now to subscribe.

CLIP THIS COUPON TODAY

MINICAM
22 East 12th St.,
Cincinnati, Ohio
Gentlemen:

Enter my one year subscription to MINICAM beginning with the issue for which I enclose \$2.50 payment in full. If not satisfied after reading three issues you will refund my money 100%.

Name

Address

City..... State.....

I would like to have you publish an article on

printer will for about \$1.50 set up a few lines of type bearing the sentiment you want to express. Included in that price he will be glad to pull you what are known as press proofs, that is half a dozen or so clean impressions of the type which you can then copy as a negative with your minicam.

If your taste happens to run to the more informal, it will cost you very little more to hire a lettering artist to draw the sentiment. He will probably prepare it in considerably larger form than you want it which can then be copied and reduced to the proper scale in the same way as the press proof.

A copy negative of the Christmas sentiment implies that the entire Christmas card will be photographic. For this you will need a printing frame which can be bought at any photographic dealers at low cost. First select from these pages the design you want to use or, if you have a better idea of your own, rough up a sketch similar to these. In either case, after your sketch is finished make a copy of it on tracing paper and then transfer the outlines of the design to a single piece of black paper which should be trimmed to the final size of the card.

From the black paper cut out the square, circle or oblong that will be your picture. If you are planning to use a picture larger than the contact size of your negative it will of course be necessary to make or have made an enlarged negative. Next cut out the section that will bear the printed or lettered sentiment. Fit the two negatives, the first of the picture and the second of the sentiment into the appropriate holes and transfer the unit to the printing frame.

Chances are you will spoil a sheet or two getting the two units of your design to fit exactly. After this preliminary, however, the sailing will be smooth. Contact printing paper, double weight, should of course be used, the grade and surface depending on your negative and the sort of finish you prefer.

Another type of Christmas card that does not imply the need for making copy negatives is the combination card. In this case the card is purchased with the senti-

to a few
ent you
price he
own as
or so
ch you
h your

é more
e more
e senti-
in con-
vant it
aced to
as the

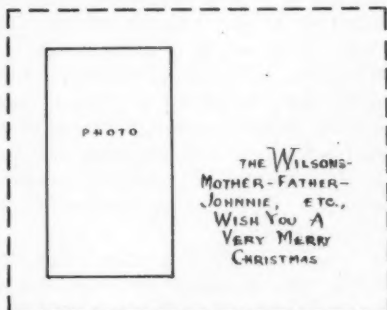
s senti-
ristmas
is you
can be
at low
he de-
a bet-
sketch
r your
it on
e out-
ce of
ed to

quare,
icture.
larger
ive it
have
nt out
ed or
tives,
nd of
holes
ame.
r two
to fit
ever,
print-
ourse
ding
you

that
copy
this
enti-

ment already printed on it by letterpress or blank white cards are purchased from a stationer and taken to be printed. Either way, the cost is very slight, certainly not over \$3 or \$4 for as many as a couple of hundred cards.

An appropriate picture is next selected. This should be either square or oblong so that it may be easily trimmed to fit. Your job is now reduced to making the proper number of enlargements and mounting them on the printed cards. For this purpose rubber cement should be used, care being taken to let the cement dry for a few moments before the picture is attached to the card. Any surplus cement that leaks from under the picture can be readily removed, once it has dried with a soft eraser or, in a pinch, with your fingertips. The advantage of rubber cement for this work is that it will not leave any smear marks after it has dried.



What to use in the way of pictures? Almost anything will do. Silhouettes are a perennial favorite. So are snow scenes, family groups, pictures of the children and scenes of your house. The picture selected, whatever the subject, should be simple and clear. Right now is the time to sort over your old negatives and make your selection.

If you are more ambitious than usual, you may want to pose a special picture for your Christmas card. Any number of still life scenes might be appropriate. For example, you might select a candlestick on the mantle and a child's stocking hung from it. Or you might introduce a twentieth century note by shooting a stocking hung from the steam radiator with the Christmas wreath showing in a window

FREE . . . A FILMIDEX and a DeLuxe Strong-Box HUMIDOR Each Month!

Can you write a good ad? Then sit down right now and write in not over forty or less than thirty words why you use or would like to use a FILMIDEX to file and completely index your minicam 35mm negative rolls. If we use your copy, we'll send you with our compliments a brand-new all-metal FILMIDEX, prepaid.

If you shoot movies, write another ad, thirty to forty words, telling why you use or would like to use a DE LUXE STRONG-BOX HUMIDOR to safely store and condition your precious reels of movies. If we use your copy, we'll send you a DE LUXE STRONG-BOX HUMIDOR with our compliments, prepaid.

All copy must reach us before the fifth of each month (contests will be run six months.) You've seen both products advertised, but we will gladly send full description if you desire.

RUSH YOUR COPY TO US TODAY!!!

WM. J. GRACE

4064 Stanford

Dallas, Texas

THE SHOT THAT SAVED THE DAY!



A "true" shot bagged the game. But the "shot" that saved this day was a *correctly exposed* shot with the camera. Sportsmen know that to *guess* at camera settings at a moment like this means a disappointment. That's why they use a WESTON Meter . . . and make sure every picture is perfectly exposed. Compact, quick, certain—the WESTON gives exact camera settings, any place, any time. Can be used with any still or movie camera. See the WESTON at dealers, or return coupon.



WESTON
Exposure
Meter

Weston Electrical Instrument Corporation
649 Frelinghuysen Ave., Newark, N. J.
Send literature on WESTON Exposure Meter.

Name.....
Address.....
City.....State.....



FOR FOCAL PLANE CAMERAS . . .

there's only one flash bulb to use
SUPERFLASH!

Superflash is the first and only flash bulb ever made to afford perfect synchronization with focal plane shutters as on the Leica, Contax, Exakta, etc. Its light-producing medium is not foil — but a special hydronalium

wire that generates a flash three times as broad at its brightest point, and develops 50% more photographically effective light during the full time the shutter is traveling across the negative. And Superflash's patented Blue Safety Spot tells you in advance that your bulb is safe to use. See your dealer today.

WABASH PHOTOLAMP CORP.

Subsidiary of Wabash Appliance Corp.
335 Carroll St. Brooklyn, N. Y.

Bargains In Used Minicams

	Original Value	Sale Price
Pilot Reflex—Meyer f3.5 lens — Compur Shutter	\$ 75.00	\$42.50
V. P. Ernemann Sportsman-Tessar f3.5 lens focal plane shutter-case included	130.00	44.50
Kodak Retina f3.5 Compur	49.50	37.50
Zeiss Super Nettel f2.8 latest model in Eveready case	123.00	74.50
Bolleicord Zeiss Triotar f4.5 in case	75.00	42.50
Zeiss Ikonmat A f3.5 Compur in zipper case	61.00	37.50
Wetti Zeiss Tessar f2.8 Rapid Compur uses Leica film 36 exp.	73.00	62.50
Baldaxette II 6x6 cm. Automatic range finder—Meyer f2.9 lens	90.00	64.50

All used cameras sold on a ten-day trial, money back guarantee.

THE CAMERA HOUSE, INC.

"New York's Fastest Growing Photo Supply House"
145 EAST SIXTIETH STREET NEW YORK CITY

ARGUS OWNERS . . .

To get a real kick out of your ARGUS, here's an eveready case that is truly EVEREADY. A flip of a button . . . and its open for that instant shot. As fast as this little camera itself. Most ideal for up-side-down shooting . . . camera fully protected . . . impossible to fall out of case. Made of full grain leather in black or brown . . . hand sewed.

Retail Price \$35.00. Liberal Discount to Dealers. If your dealer cannot supply you please write to

RUSSELL L. ALLISON—Originator and Manufacturer
1358 La Salle Avenue Minneapolis, Minn.



above it. An outdoor shot of the Christmas rush introduces a mildly humorous note that could offend nobody and so does one of those Santa Claus street corner figures who make their appearance in ragged beards along about now, or a little later.

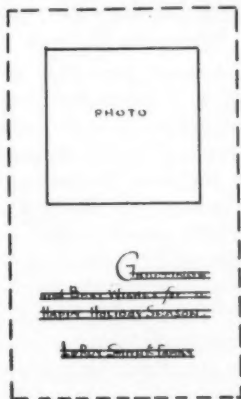
If you are handy with a pair of scissors you might experiment in making cutouts or borrow some ideas from magazines or newspapers. If you can make the cutout, the rest of the job is simple enough. The picture is cut out of a mask as with the combination printing mentioned earlier and the light permitted to shine through the mask, thereby making that part of the card black. Your own ingenuity will suggest other methods of utilizing cutouts or silhouettes. There are any number of ways they can be used.

If you like to do things the lavish way, natural color transparencies offer you an opportunity to make Christmas cards that are both different and costly. The color shot you select as your subject can be copied, as often as you like on Dufaycolor film. The finished picture, as you know is a transparency which, when viewed through transmitted light, shows the subject in all its natural color. Duplicates of the picture are made by projection so that they can be of any size in which the film is available. Processing is done by the Dufaycolor Company.

After you have received your transparencies your next job is to trim them to the desired size and then cut holes in your cards, these holes to be slightly smaller than the picture so that a margin for pasting down on all four sides is available. A thin coating of rubber cement is put around the four sides of the card on the

back and, after it has been allowed to dry a bit, the picture is mounted, just as it would be in a frame. Care should be taken that the rubber cement does not ooze onto the picture surface from which it can be removed but at the risk of scratches.

The Christmas card will not look particularly impressive when it is first viewed, but the effect when it is held up to the light will be startlingly different.



Hand coloring is a cheaper and lots easier process. You can get a complete set of photo oil colors and a couple of brushes at a nominal cost and put your own color either into the picture or on the card. Very little is required in the way of skill, but quite a bit when it comes to patience.

Plain or colored, all photographic or a combination, the individualized Christmas card is still the tops in greetings. They're fun to receive and just as much fun to make on long fall evenings. If you want to try your hand at it don't let December 24th catch you napping. Right now is the time to get busy.

Bass Bargaingram

Vol. 27 No. 3 CHICAGO, ILL. November, 1937



CANDID CAMERA BARGAINS

Like new—on the Bass money back guarantee

Like new. Leica Model G. chrome, 50mm. Summar F:2 lens, Eveready case. List \$221.10. Special at\$157.50

Contax Model I, speeds 1/2 sec. to 1/1000 Tessar

F:2.8 lens and case, fine condition.....\$109.50

Contax Model II, chrome, 50mm. Sonnar F:2 lens,

Eveready case, like new.....\$177.50

Contax Model II, 50mm. Sonnar F:1.5 lens and

Eveready case, like new. List \$334.00.....\$237.50

Contax Model III, 50mm. Sonnar F:2 lens and

Eveready case, like new. List \$298.00. Bass

price\$227.50

Contax Model III, 50mm. Sonnar F:1.5 lens and

Eveready case. List \$386.00. Price.....\$287.50

Contaflex with 50mm. Sonnar F:2 lens and Eve-

ready case. List \$362.....\$260.00

Contaflex with 50mm. Sonnar F:1.5 lens, with

Eveready case. List \$449. Price.....\$320.00

Extra lenses for Contaflex:

85mm. F:4. List \$85.00. Price.....\$63.75

135mm. F:4. List \$108.00. Price.....\$81.00

85mm. F:2. List \$215.00. Price.....\$161.25

Plate backs for Contax or Contaflex. Like new.

List \$25.00. Price.....\$15.00

Plate holders for Contax or Contaflex. Like new.

List \$1.80. Price.....\$1.20

DE FRANNE SPORT

2 1/4 x 3 1/4, also takes 16 V. P. on No. 120 roll. Rodenstock Anastigmat F:3.8 lens. Pronitor speed shutter with delayed action, sole leather case, velvet lined.....\$29.75



DOLLINA "O"

A 35mm. candid camera with automatic counter and film locking device, optical view finder, focuses to 4 ft. A precision instrument making 36 exposures 2 1/2 x 3 1/2 with Contar Anastigmat F:4.5 lens. Vario shutter.....\$18.90

Eveready case\$5.00

Write for New Bass Bargaingram—Listing just the items you want.

Bass

CAMERA CO.

Dept. MM, 179 West Madison Street
CHICAGO, ILL.

"The Camera Cross Roads of the World"



FOR GORGEOUS ENLARGEMENTS

Wollensak's Enlarging Velostigmat — famous for transferring to your enlargement every finest detail in your negative, with glorious fidelity. Fast—f3.5 and f4.5 in 2", 3" and 3½" focus; f6.3 in 2" and 3½". Know this splendid lens. Write for literature, moderate prices and free trial offer now.

WOLLENSAK OPTICAL COMPANY
629 Hudson Ave. Rochester, N. Y.

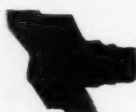
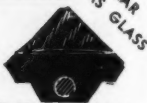
WOLLENSAK

TRANSPARO

Art Corner's

Mount your Minicam prints with complete visibility! Remove them at will! Only 15c for boxette of 100! Order from your dealer or write

Engel Art Corner Mfg. Co., Dept. 31-Z, 4711 N. Clark St., Chicago.



NEW MONOCULAR VIEWER

for 8-16 and 35 mm. films.
The all purpose negative and positive viewer.

\$1.00

At your dealer or send direct
DIAMOND DEE STUDIOS, Bedford Bldg., Chicago

VICTOR FOTOFLOOD and FOTOFLASH UNITS Illuminate Your Subjects More Powerfully and Evenly



Victor's correctly designed spun aluminum reflectors illuminate subjects more strongly than ordinary reflectors, and four and one-half times as strongly as when no reflector is used.

They are excellently constructed, nicely finished, and moderately priced.

There is a Victor Clamp-On, and Single and Twin Stand model for each size of Photoflood and Photo-flash lamp.



Procure From Your Dealer, or write us for descriptive folder

J. H. SMITH & SONS CORP., 311 Lake St., GRIFFITH, IND.

Our Front Cover

THIS month's cover shot is by Dudley Lee, done with Kodachrome in a Contax. The exposure was 1/50 of a second at f6.3. Three lights were used; one to the left of the model, one to the right, and the third in the background to illuminate the bull. The latter is a hand colored cut out, and was suspended in position from a long tripod.

Would you like to submit a color shot for MINICAM's front cover? If sending a Dufay or Kodachrome be sure to pack it carefully, and enclose stamps for return by first class mail. MINICAM likes to buy pictures from its readers. Color film to fit most any camera is easily obtainable. Think up an idea for a MINICAM front cover and shoot it in color. Be sure to send along model releases with your picture.

Trick Effects with your Miniature Camera

(Continued from page 12)

one part of it closer to the lens than another. Best procedure is to focus sharply on the center area of the picture and then stop down the lens for maximum depth of focus. Even so, the edges are likely to be slightly fuzzy.

A variation of this procedure is to curve the enlarging paper on the easel in such a way that it bulges decidedly in the middle. Results are unpredictable, but always startling. Along about now, it has occurred to you that distortion can be made to serve a very useful serious purpose. Quite right. Clever tilting of the easel can be made to

straighten out a slanting horizontal line, or correct the tendency of tall buildings to slope together. Distortion used for this purpose serves to correct faulty perspective in the picture.

Pictures In Relief

PERHAPS the most startling effect in all trick photography is the "Bas-relief," which may be defined as a picture slightly raised from the surrounding background. This effect, when cleverly done, has so genuine an appearance, that people will frequently touch the print before they actually believe the surface is not raised.

You start out with a negative, preferably one with strong lines and detail, as a building, showing the bricks, casement windows, etc. From this you make a positive print by contact on positive film, not paper. You now have two pieces of film, one a negative and the other a positive transparency. When the positive is dry, it is placed, emulsion to emulsion, in contact with the negative. It is then moved, just a trifle, so that the two images do not quite coincide. If the images are too close together the effect does not occur, and if they are too far apart result is only a fuzzy mess. A few trials on test strips will indicate the exact degree of offset.

Once position is determined, the two films are bound together by means of Scotch tape or adhesive. This is then placed in the enlarger and printed in the usual way. Result—the bas-relief. Don't tell how you did it because you won't be believed anyway. Fig. 5 is a bas-relief portrait of MINICAM's candid camera editor, Karl A. Barleben, Jr., taken by Morris Germain.

Making human figures look like statues is almost too easy. All you need do is to grease your subject heavily, with olive oil, cocoa butter or any other fat that will glisten under light. If then you will print the final picture somewhat more heavily than usual, one of the most mystifying tricks in all photography is accomplished without further ado. Lighting should be quite even and the post, of course, fairly static and immobile.

We have Everything
PHOTOGRAPHIC New or Used
at attractive Prices

Model G LEICA'S (like new)
F2 Summar Lens.....\$135 up
Anastigmat. Postpaid.....\$12.50
ARGUS Model A F4.5—
Many other miniature camera buys
—write us on your requirements.
Get our prices before you buy.

SEND US YOUR ROLLS
Using the Pavelle Fine Grain De-
veloping. Enlargements up to 20"
diameter.

We are the **CAMERA EXCHANGE ORIG-
INATORS.** Address all replies to Dept. M.

NEW YORK CAMERA EXCHANGE
109 FULTON ST. NEW YORK

TAKE PICTURES **FREE**
for Pleasure & Profit **CAMERA CATALOG**

No a camera expert—
make your own prize
winning pictures. Do your own
finishing and enlarging. It's a grand
hobby—easy and fascinating. Send
for Catalog No. 1037N just off the
press—full of bargains.

**SAVE MONEY ON
CAMERAS, LENSES
AND SUPPLIES**

Since 1897 we have been headquarters for
fine cameras—new, used and reconditioned.
See the hundreds of bargains in accessories,
dark room equipment and supplies. Every-
thing for the photographer at money saving
prices. Write Dept. M-37 for your copy.

BURKE & JAMES, INC.
223 W. Madison St., CHICAGO, ILL.

Mogull's Phenomenal Bargains

Inspectograph Camera for Finger Printing, com-
plete, \$34.50—Plaibel Makinette F2.7 lens, Compur
Shutter—case and filters \$57.50—35mm. Robot F2.8
lens \$121.50—Leica Model G Sonnar F2 lens \$139.50
—3/4x4 1/4 Graflex F4.5 Lens \$35.00—2 1/4x3 1/4 R. B.
Ruby Reflex F4.5 Lens \$34.50—Graflex R. B. Series
D 4x5 Cooke Pressic 7 1/2" F3.5 Lens with case, com-
plete, \$155.00—Kodak Duo 620 F3.5 Lens, Compur
Shutter \$39.50—Foth Derby F3.5 Lens \$13.49—Argus
Cameras now in stock, \$12.50, New Model. 45x105-
mm. Stereo Camera Matched F4.5 Lens—\$42.50.

Trade your old equipment and camera for every-
thing in motion picture and photographic lines.

CATALOGUE FREE

MOGULL'S 1944 Boston Rd., Dept. MN
NEW YORK, N. Y.

Natural Color Film, What It Is and How to Use It. \$1.50
By Clifford A. Nelson

A volume for the amateur who desires to achieve the full
beauty available in Kodachrome in both motion picture
and still photography. Illustrated with exposure tables
Pictorial Photography with the Miniature Camera. .50c
By George W. Hesse

A book on how to make home portraits with minimum
effort and expense. Contains hints on composition, light-
ing, film make-up, etc.

Composition Simplified75c
By Herman Gabriel

A remarkably popular book that reduces good composi-
tion to simplified formulae. Written and illustrated for
the benefit of the beginner.

MINICAM Order from 22 E. 12th ST.
Cincinnati, Ohio

IT'S SERVICE THAT COUNTS

Amateur photographers who recognize the value of superior service know that at Klein & Goodman's they get helpful and intelligent attention to their needs. And with that service, there's a complete camera store with EVERY popular make of camera and photographic equipment.

- All leading makes of cameras and lenses
- All developing and printing materials
- Enlargers and projectors
- Photographic Books
- Exposure Meters
- Full line of Kodaks and Cine-Kodaks

**Fine-Grain Processing
and Enlarging**

KLEIN & GOODMAN

Everything Photographic

18 S. 10TH ST. PHILADELPHIA

THE FINE GRAIN DEVELOPER

1. Grain structure as fine as the best of surface developers
 2. Quality equal to Borax negatives
 3. Excellent printing quality without additional exposure
 4. Contains no dyes
 5. Will not stain fingers or negatives
 6. Does not contain any irritating poisons
 7. 32 oz. will develop 30 rolls 35 m. m. 36 exposures
 8. A full control developer, giving contrast control with time
 9. Will not block highlights
 10. Works equally well with all makes of film
 11. Packed in 32 oz. units at \$1.75 or 1 gal. size at \$5
- On sale at all leading photographic dealers

RAYGRAM CORP.

425-M 4th AVE., NEW YORK

PRESS CARDS

For Free Lance Photographers . . . 25c
A helpful aid for getting outstanding pix.

★ ★ ★

Write for our list of carefully selected books on photography.

GENERAL NEWS, Dept. U, Rm. 1637

RCA Bldg., Rockefeller Center, N. Y. C.

35mm. Film

DuPont Superior Eastman Super X

"Load Your Own"

5 Separately Wrapped Rolls 5 ft. each—75c
100 ft. at \$2.75

No Order less than 100 ft.

C. O. D. Hollywood, Cal.

HOLLYWOOD RAW FILM CO.

P. O. Box 3056, Hollywood, Cal.

Angle and Close-up Shots

The tendency of short focus lenses to show nearby objects in false perspective can be turned to telling effect in trick photography. Fig. 2 is how a baseball catcher equipped in full turnout looks to the worm's eye camera angle. Note the tremendous enlargement of the feet and legs giving the impression of some weird futuristic Robot. The only trick employed here was the camera angle from the ground.

A variation of the trick angle is Fig. 6, "Cigarette Smoke." This is in reality no more than an ordinary close-up taken with a wide-angle lens, the negative made to fill the entire frame and then enlarged. All sorts of trick effects can be evolved through variations of close-up photography and enlargement.

We have listed only a few of the very many weird and beautiful effects possible through trick photography. Each of the basic principles, multiple exposure and printing, framing, distortion, is capable of practically limitless variation, either by itself or in combination with one of the other methods. Thus, you could get multiple prints of a subject on one paper and introduce distortion as well as a new background. Examples could be cited endlessly. Instead, we'll leave you to try some of your own.

Variations In Form

(Continued from page 40)

mentioned. A heavy thigh or undue swelling of the hips, however, are flaws (when they are not wanted) easier to correct by changing the model than any other way.

The placing of accents or the subduing of weak points is easiest accomplished by means of lighting. This is something with which the amateur will encounter difficulty at first. The human eye has the power of adapting itself to considerable variation of illumination with the result that a slight shadow or imperceptible increase of light at any one point will escape unnoticed. Since the sensitized emulsion does not respond in the same manner, some method of "reading" light quality is very desirable.

For this purpose, a neutral viewing filter is admirably fitted. Such viewing filters are made by several companies and are available at reasonable prices from your dealer.

There are faults of anatomy, however, not susceptible to correction through lighting. Considerable modification can be introduced through the manipulation of perspective. Objects closer to the camera, particularly with short focus lenses operating at wide aperture, will appear larger than those further away, a phenomenon the average minicam fan probably encountered with his first roll of film. Note how skillfully the arm near the camera in Fig. 4 has been made to appear of heroic proportions. By extension, objects on a receding plane can be made to appear longer as the line from shoulder to waist in Fig. 1, while those on an approaching plane can be made to seem shorter, as the line of the thigh in Fig. 3.

A heavy model can be made to seem slimmer by emphasizing long, continuous lines while one who is thin can be given fullness by breaking the line from shoulder to waist. A foot that is too long will seem smaller and dantier if the arch is faced up, as in Fig. 2. The foot raised off the ground as in Fig. 6, is another method of concealing its size.

Height can be emphasized by placing the camera in a low position with relation to the model as in Fig. 7. Shooting from above will tend to make the model appear shorter, as in Fig. 5.

All these seem like a considerably body of information to bear in mind, yet are not nearly so complex in the execution as in the description. The basic forms are two, the Nordic and the Latin from which spring the variations according to traditional usage. As for correction of physical faults through light and camera position manipulation, the lessons of general photography carry over with equal application to figure work. A certain amount of practice is necessary, of course, but what seems at first reading like a series of small points will soon codify into a technique of good usage.

BARGAINS LIKE THESE

A few of our many bargains in display samples.
Some used — many never loaded

CONTAX I F/2.8	\$110.00;	F/2	\$140.00;	F/1.5	\$190.00
CONTAX II F/3.5	\$170.00;	F/2	\$195.00;	F/1.5	\$250.00
CONTAX, IF/2.8 F/2 F/1.5					
CONTAX with universal case, with extra lenses, finders, filters, plate back, etc.; very special					\$300.00
LEICA D F/2, case and filters					\$125.00
LEICA G F/2, case and filters					\$159.50
LEICA D F/2.5, case and filters					\$95.00
FOTH DERBY, WELTA, KORELLE, EXAKTA, all models					
IKONTA SUPER A, B, C, all lenses					\$45.00 to \$115.00
9x12 Dbl. Ext. F/4.5, NEW					\$39.50
ROLLEICORD, F/3.5					\$45.00
ROLLEIFLEX & IKOFLEX					\$35.00 to \$75.00
SUPER DOLLINA II					\$50.00
DOLLY SUPERSPORT; split 120 or 2 1/4-sq. picture					\$35.00
SPEED GRAPHIC 4x5, coupled finder, less lens					\$85.00
SPEED GRAPHIC 4x5 with F/4.5 lens					\$70.00
35 MM Bak. Tank, \$9.50 value					\$6.75
GRAFLEX 3 1/4x4 1/4 SER B, F/4.5 K. A. lens					\$49.50
GRAFLEX SER D, 1 month old, looks like new					\$100.00
Famous F2.9 Marvel with case					\$29.50
9x12 CM, 3 holders, new, doub ext., no lens					\$15.00

SEND FOR FREE LIST

WELLS - SMITH

71 E. Adams St., Dept. 111, Chicago, Ill.
Formerly at 26 North Wells St.

THALHAMMER "MIDGET" KINO-PANO-TILT



This little tripod head embodies in it all the patented features of our \$55.00 Professional Model — with the same design and careful workmanship. For Eastman, Contax, Leica, Graphlex, etc., and the 8mm.

Cine Camera — weighs only 10 oz. Fits any tripod.

ONLY EIGHT-FIFTY At Your Dealer's

THE THALHAMMER COMPANY

121 Fremont Avenue

LOS ANGELES, CALIF.



NEW!

FR

ADJUSTABLE
ROLL FILM TANK

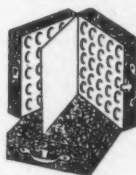
Fully adjustable to films of all sizes from a full 36 exposure roll of 35 mm. to No. 116.

\$5.95

FINK-ROSELIEVE CO., INC.

109 West 64th Street

New York City



Minicam Film Storage and Carrying Case

For 35 mm. and Minicam Film

HOLDS 30 ROLLS

A leatherette covered case that will give your films perfect storage and fire safety. PRICE.....

\$3.75

(On sale at all good dealers.) If your dealer cannot supply you order direct with remittance.

MIROTEX PRODUCTS

6241 Southwood

St. Louis, Mo.

Speed Flash Photography

(Continued from page 26)

usually associated with indoor flash from the camera position, the flash bulb can be placed in a floor or table lamp at a considerable distance from the camera and the electric cord from the lamp then plugged into the socket of the synchronizing unit. More elaborate synchronizing units are available which will fire three or even four bulbs either simultaneously or at staggered intervals, depending on your studio needs. For amateur use, however, a single flash usually suffices, particularly if it is used in conjunction with other light.

We mentioned the possibility of controlling backgrounds and throwing out of detail backgrounds which would only clutter the picture and distract from the principal object. The procedure is the reverse of that used to obtain background detail. In this case, a maximum shutter speed is used and the camera focused on the principal object which the flash illuminates, thereby throwing the background not only out of focus but also into deep shadow.

Many other effects will suggest themselves as you begin to explore the almost limitless possibilities of flashlight. The cost is low, the apparatus is easily portable and will fit just about any make of miniature camera without special attachment cost. So, if you want to make those gorgeous winter scenes when the light is weak, or if you bemoan that your miniature does not have a lens fast enough to catch action, stop wailing and learn about flashlight — the newest and perhaps most potent ally of minicam photography.

Taking the Clouds

(Continued from page 52)

mentary filter is used. You can take it as a general rule-of-the-thumb that filters ranging from light yellow through orange to red will give cloud effects proportionately stronger and heavier as the filter is darker. By the same token the sky will be rendered progressively blacker until with the red filter and Infra-red film the sky will appear almost totally black.

YOU must not, however, presume that if a touch of clouds is good, then a lot is better, and a whole heap fine. Everything depends on the general effect you are seeking. If it is your intent to show a lowering sky in which huge fat clouds hang in threatening fashion, then your dark orange or red filter will turn the trick. If what you want is a peaceful landscape with a few bits of fleece to break up the general expanse of blank sky overhead then you want no filter at all with panchromatic film or only a light yellow at most.

A good lens shade is a "must" in cloud photography if you want to avoid having your film light-struck and generally full of fuzz. Even then you should avoid shooting directly into the sun if you can possibly help it.

Whether as a hobby in itself or as a supplement to good, all around photography you owe it to yourself to give more than occasional passing thought to the clouds. It's fun to be able to spot the various types which are not nearly so many as one might offhand think or as hard to know as would seem from their elaborate names. Next time you start out to photograph a landscape pay a little heed to the cloud composition. Your pictures will be the better for your effort.

Note: 

THE SISTERS

BY CHARLES JONES

Taken at St. Petersburg, Fla. The camera was a 6 x 6 cm. Rolleiflex fitted with a 35 mm. back. Zeiss Tessar f3.5 lens, 75 mm. focal length fitted to Compur Rapid shutter. Exposure was 1/50th at f8. The picture was made about 11 A. M.

NICAM

ke it as a
ers rang-
range to
tionately
darker.
rendered
the red
will ap-

me that
, then a
. Every-
fect you
show a
t clouds
en your
he trick.
andscape
up the
ead then
anchro-
at most.
in cloud
having
y full of
shooting
possibly

as a sup-
ography
ore than
clouds.
us types
e might
s would
s. Next
a land-
compo-
etter for



ES JONES

essar / 3.5
icture was



Clarence Brown

DIRECTOR OF METRO-GOLDWYN-MAYER'S CURRENT MOTION PICTURE,
"CONQUEST," STARRING GRETA GARBO AND CHARLES BOYER

says: "To make good
movies you must have
a good camera . . .
Even amateurs make
fine color movies with
this palm-size Filmo"



Magnificent scene from the movie, "Conquest," starring Greta Garbo and Charles Boyer

**WORLD'S FINEST,
SMALLEST, CANDID
MOVIE**



Filmo

\$55

AS LITTLE AS \$11 DOWN

BELL & HOWELL

CLARENCE BROWN, famous Metro-Goldwyn-Mayer director and producer, uses a Bell & Howell Filmo camera for making his personal movies. He knows that precision workmanship and a fine lens are essential for theater-quality movies—that Filmo amateur cameras are made with the same 10,000th-of-an-inch precision as Bell & Howell professional equipment, considered the finest by cameramen the world over. Filmo is even easier to use than still cameras. The subject is always seen distinctly through the spyglass viewfinder, and *what you see, you get.*

Using the inexpensive 8 millimeter film, this Filmo takes movies with still-picture economy—keeps the action of those unforgettable scenes in beautiful natural color, or in brilliant black-and-white. Filmo is palm size—is easily carried in a pocket—the world's smallest quality movie camera. With high grade F 3.5 lens for indoor as well as outdoor movies, only \$55 at camera stores everywhere. Other 8 mm. Filmos to \$85. Filmo 16 mm. cameras from \$65 to \$1155. 16 mm. Sound Projectors from \$465 up.

INTERESTING BOOK—How easily and economically you can have movies you'll be proud to show is told in "How to Make Inexpensive Personal Movies." Mail the coupon now. Bell & Howell Company, Chicago, New York, Hollywood, London. For thirty years the world's largest manufacturer of precision equipment for motion picture studios of Hollywood and the world.



BELL & HOWELL COMPANY
1832 Larchmont Ave., Chicago, Ill.
Please send me the book:

Name.....
Address.....
City..... State.....
JMC11-97



o-Goldwyn-
s a Bell &
is personal
rkmanahip
ter-quality
are made
ecision as
t, consid-
l over.
cameras.
ough the
get.
his Filmo
— keeps
beauti-
-white.
pocket
amera.
well as
every-
mm.



IPANY
icago, Ill.

...JCI11-97